



ELX16-240

User's Guide (CCTV Monitor User)

(v 1.0)

FCC Compliance Statement

Caution : Any changes or modifications in construction of this device which are not expressly approved the party responsible for compliance could void the user's authority to operate the equipment.

NOTE : This equipment has been tested and found to comply with the limits for a Class A digital device, pursuant to part 15 of the FCC Rules. These limits are designed to provide reasonable protection against harmful interference when the equipment is operated in a commercial environment. This equipment generates, uses, and can radiate radio frequency energy and, if not installed and used in accordance with the instruction manual, may cause harmful interference to radio communications. Operation of this equipment in a residential area is likely to cause harmful interference in which case the user will be required to correct the interference at his own expense.

Warning

This is a class A product. In a domestic environment this product may cause radio interference in which case the user may be required to take adequate measures

CAUTION

1. Danger of explosion if battery is incorrectly replaced. Replace only with the same or equivalent type.
2. Disposal of used batteries according to the general recommendations against the environmental pollution.
3. Do not throw the batteries into a fire, and do not heat, short-circuit or attempt to disassemble the batteries.
4. Do not attempt to recharge the batteries.

Important Notice

1. Do not place heavy objects on the top of the ELX16-240.
2. ELX16-240 is for indoor use. It is not weatherproof. Use ELX16-240 with referring to its environmental specifications (Temperature & Humidity). To clean the ELX16-240, gently wipe the outside with a clean dry cloth.
3. ELX16-240 uses AC power of 110V ~ 220V. Be cautious not to cause electric damages to ELX16-240.
4. Be careful not to drop the ELX16-240. Physical shocks may harm the product. In addition, be sure the ELX16-240 is secured after installation.
5. ELX16-240 is made of metal. Therefore you can hurt human beings if you throw it to them or hit on them. When installing ELX16-240, be cautious to locate on safe places where children are unreachable.
6. If ELX16-240 does not operate properly, please contact the closest distributor for after sales service. Tampering or disassembling the product will void the warranty.
7. Security surveillance laws may differ for each country. Therefore, please contact the local region first to avoid any surveillance law violations.

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OVERVIEW

1. Introduction

ELX16-240 supports 16 analog video channels. Video, Audio, and Text Event-Logs are digitized and stored on two internal hard-drives. Using a 'Proprietary Wavelet Algorithm,' average file size is 1-5KB while still maintaining clarity high enough for facial-recognition. In addition, Wavelet-compressed images are impossible to manipulate.

Due to our proprietary Wavelet Algorithm, the ELX16-240 processes analog video into crisp, clear, and court-admissible pictures that are up to 500% smaller than comparable JPEG images. With this efficiency, ELX16-240 records over 15 days on a 200GB hard disk drive when recording 16 channels at the speed of 5fps per channel. ELX16-240 also allows users to record and playback audio for one channel.

Setting-up ELX16-240 is as easy as setting up a VCR. ELX16-240 starts to record as soon as power is supplied and CCTV cameras are connected. ELX16-240 offers an easy setup, as well as advanced menus. With 'Quick Setup', ELX16-240 can be setup and begin recording in as little as 5 minutes. The default settings offer quality and efficiency without the hassle of confusing menus.

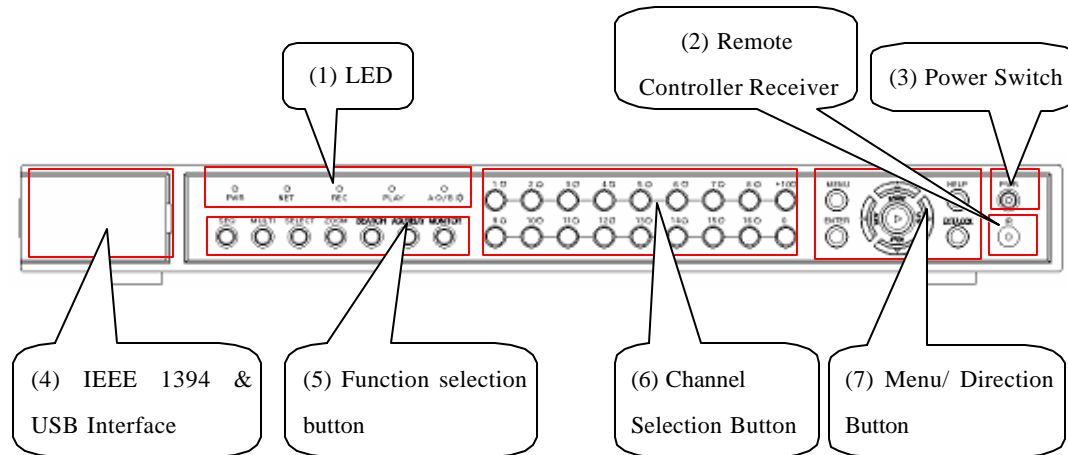
Equipped with (2) IEEE 1394 ports (Fire-Wire), ELX16-240 can expand its recording capacity to up to 4TB easily. For easy backup, Windows (FAT32) formatted HDD is compatible with ELX16-240. Simply back up the desired data and connect the HDD to your PC to review critical images. And with (1) USB port, user can copy small sized images within 60 seconds.

Key features

- 16 analog video channels
- 1 channel audio recording & playback
- Recording, Playback, Back-up, Network recording, and Network playback at the same time (Pentaplex)
- Total 240 ips recording speed
- Total 480 ips display speed
- Displaying live and recorded images on PC as well as CCTV Monitor
- Dual CCTV Monitor (1 Normal, 1 Spot)
- Built-in hardware Quad Splitter for analog video
- Built-in software multiplexer for all 16 live monitoring channels
(1 / 4 / 9 / 16 / 13 Ch Mode on CCTV Monitor as well as PC)
- Maximum 4TB storage capacity (IEEE 1394 for external HDD)
- Various configuration with recording and playback conditions
- Intelligent file system for managing event triggered video data
- ATM/POS transaction information text recording and search with corresponding video
- 16 sensor inputs and 4 alarm outputs
- Built-in hardware motion detection with search function (64-division comparison)
- Back-up with IEEE 1394(FiWi).
- PTZ Control (Preset support) via RS 232 and RS 485/RS422
- User-friendly 32bit True-colored Graphic OSD Menu
- Dynamic IP (DHCP, Floating IP) support (when xDSL and Cable Modem are used)
- Optimized Wavelet compression: 1-5KB (Average file size with standard image quality)
- Embedded Linux OS for excellent stability and reliability
- IR remote controller (User controls PTZ with remote controller)
- DVR Manager (User Interface of PC) is to be listed with 32 units of DVR on a program
(512 channels(32sets of ELX16-240 x 16 channels) are controllable through a program)

2. Product Description

2.1. Front Panel



(1) LED

- PWR** : Displays power status. When lit, power is supplied.
- NET** : Displays the status of Ethernet connection and rate of communication. When blinking, data being transmitted or received over the Ethernet.
- REC** : Displays image recording status. The rate of blinking indicates the speed of recording. (i.e. When blinking rapidly, ELX16-240 is recording at a high rate; when blinking slower, the ELX16-240 is recording at a lower rate.)
- PLAY** : Displays playback status. The rate of blinking indicates the speed of playback. (i.e. When blinking rapidly, ELX16-240 is playing back at a high rate; when blinking slower, the ELX16-240 is playing back at a lower rate.) Its status is same when using DVR Manager.
- A / B** : Displays monitor status. When selecting monitor A, LED is off. When selecting monitor B, LED is on.

(2) Remote Controller Receiver

(3) Power Switch

When pressing the power switch during 5 seconds, a dialogue for entering admin password occurs. In order to cut off power, key in the password.

(4) IEEE 1394 & USB Interface

Supports each 1 port for IEEE1394 and USB

(5) Function selection button

- SEQ** : To select Sequencing Mode. ELX16-240 will automatically display all connected channels in successive order. When pressing during 1 second or above, User Sequence Mode runs.
- MULTI** : To select the multi-channel display (4/9/16/13 divided screen).
- SELECT** : To select video channel for PTZ control in monitoring mode and for Copy/Backup/Delete in Playback mode
- ZOOM** : To activate the digital zoom (single channel mode only).
- SEARCH** : To search the recorded image in Playback mode
- ACK/RELAY** : To toggle the Relay On/Off function in Monitoring mode or to go back to previous status at alarm pop-up mode
- MONITOR** : To select monitor (A or B) for controlling

(6) Channel Selection Button

To select video input channel in monitoring and playback mode.

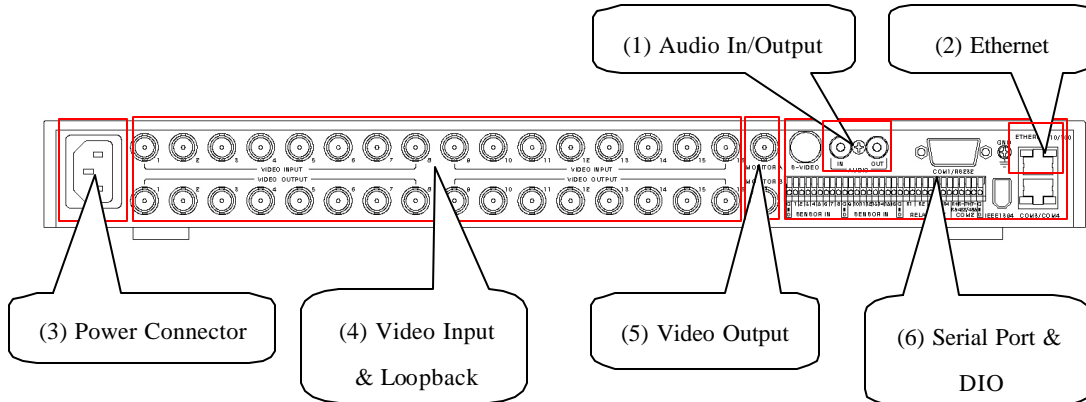
LED above channel shows each status of channel.

- GREEN** : Shows monitoring mode
- ORANGE** : Shows alarm (MD, Sensor, No Video) triggered status
- RED** : Shows relay (R1~R4) running

(7) Menu/ Direction Button

- MENU** : To set PTZ and access Configuration menu .
- ENTER** : To enter and confirm the selected menu
- HELP** : To change the image information display (Date, Transfer speed, etc).
- EXIT/LOCK** : To exit from the selected menu or lock current screen.
- Arrow key** : To Replay function in playback mode or to move inside the Configuration menu

2.2. Rear Panel



(1) Audio In/Output

1 audio input & 1 output

(2) Ethernet

(3) Power Connector

(4) Video Input & Loopback

16 video inputs & loopback port

(5) Video Output

2 video outputs (1 Normal, 1Spot)

(6) Serial Port & DIO

Sensor In : 16 sensor inputs

Relay Out : 4 relay outputs

COM1 : RS232 9Pin D-Sub connector

COM2 : RS422/485 terminal block

COM3/COM4 : RS232 & RS422/485 RJ45 connector

IEE1394

2.3. Installation Summary

- Connect Camera
- Connect Monitor
- Connect Ethernet (This is optional to view image on remote location)
- Connect Audio
- Connect Power & Run

Basic Configuration

3. Monitoring

Once power is supplied to ELX16-240, all connected channels will be displayed by split monitoring mode (When 8 analog channels are connected, 9-split screens will show). The following steps apply for all ELX16-240's monitoring menus.

<Note>

ELX16-240 supports dual monitor (A, B). Monitor A(Normal) supports all functions, but Monitor B(Spot) doesn't support split screen, menu setting and zoom function. However when Monitor A runs as Playback mode, Monitor B can't run Playback mode simultaneously.

The following functions are described on the base of Monitor A.

For controlling Monitor A, Monitor A should be selected with the front panel menu.

3.1. Viewing basic screen

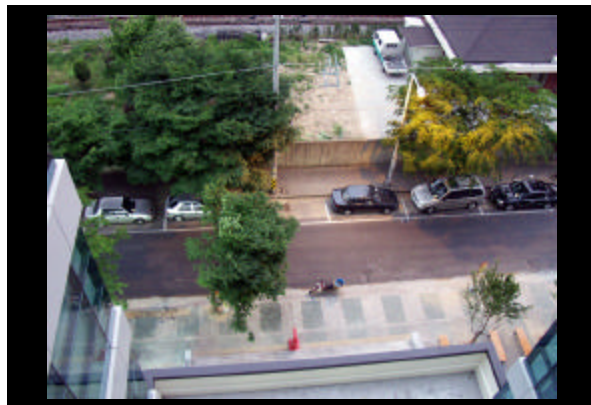
- Insert AC cord's plug in a wall outlet, and ELX16-240 starts running automatically.
- LED is on and ELX16-240 starts booting.
- After start-up, a split screen is displayed according to the number of connected channels (The example is when connecting 4 channels.)

* If user password is set, a dialogue box for entering the password will appear.



3.2. Viewing single full screen

- Press the desired channel number button on the front panel of ELX16-240.
- To return to the multi-view screen, press the [MULTI] button.



3.3. Viewing multi screen

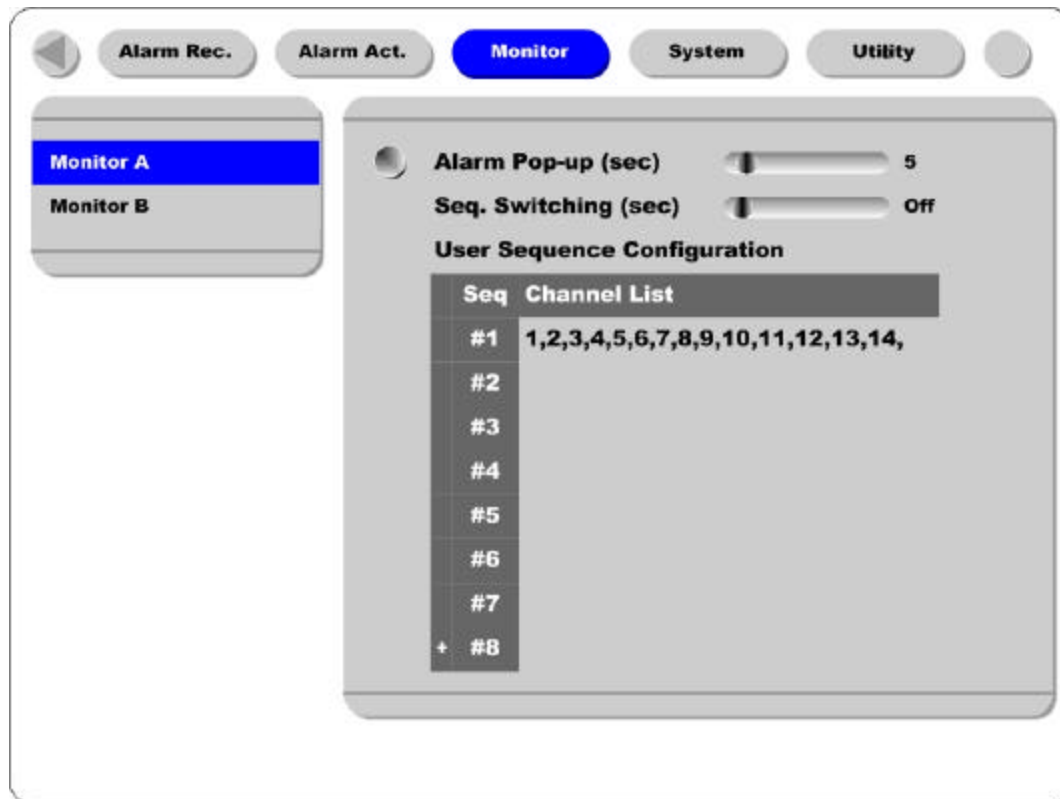
- Press the [MULTI] button to view several channels simultaneously.
- To change the split screen configuration, press the [MULTI] button. 4 / 9 / 16 / 13 split screens will be displayed

3.4. Viewing all channels with sequence mode

There are two modes; basic sequence mode and user sequence mode. User sequence mode runs when pressing the [SEQ] button during 1 second or above.

3.4.1. Basic sequence mode

- All channels can be viewed in successive order automatically using the [SEQ] button.
- Press the [MENU] button on the front panel to set-up the sequential cycle. (The default value is 3 seconds per channel for display.)
- Select "Monitor A" menu of "Monitor" tab among Configuration menus. And press the [ENTER] button.
- Select "Seq. Switching(sec)" and set any value between 1 and 60 seconds.



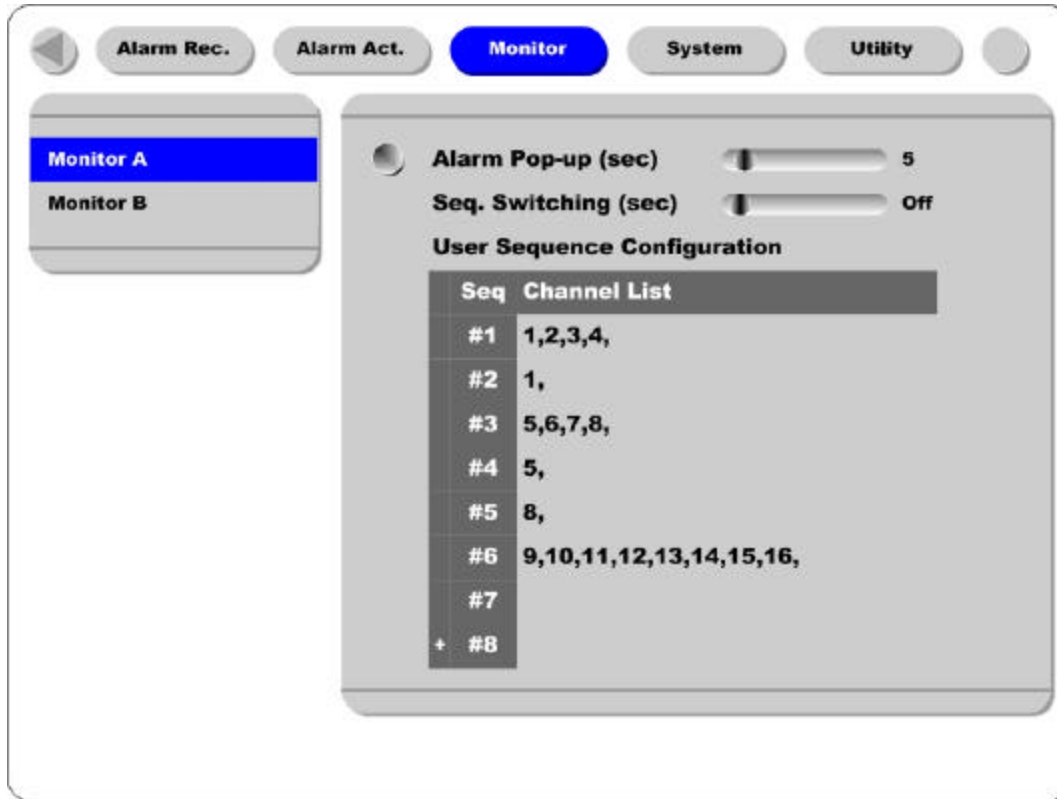
- In order to move to sequence mode from any viewer mode, press the [SEQ] button.
- In order to exit from sequence mode, press the [SEQ] button once again.

<Note>

Sequence mode can run only when connected and activated cameras are more than split screen. With single full screen mode, activated cameras should be two or more. With quad-split screen mode, there should be five or more activated cameras. In 16 / 13 split mode, sequence mode can't be used.

3.4.2. User sequence mode

- Press the [SEQ] button during 1 second or above.
- User sequence is set in “User Sequence Configuration” of “Monitor A”.



<Note>

1. User sequence mode can be configured up to 16 sets.
2. The example above is when 6 sets. In this case, ELX16-240 shows in order; quad split screen (1,2,3,4) → full single screen (1) → quad split screen (5,6,7,8) → full single screen (5) → full single screen (8) → 9 split screens (9,10,11,12,13,14,15,16)

3.5. Viewing an alarm triggered channel

- When an alarm is triggered, the related channel will pop-up full screen automatically.
- The pop-up duration is set in “Alarm Pop-up Hold (sec)” below the “Monitor A” menu.
- If more than one channel is triggered by an alarm, the related channels will be displayed simultaneously in a split-screen. In order to move current screen, press any button.

<Note>

1. When Alarm Pop-up Hold (sec) is set as “Off”, this function doesn’t run.
2. When Alarm Pop-up Hold (sec) is set as “Keep”, pop-up screen keeps showing before pressing any button.

3.6. Viewing images with Digital Zoom

- In Single Full Screen mode, live and recorded images can be expanded using the Digital Zoom feature.
- To enable the digital zoom, press the [ZOOM] button.
- Digital Zoom will expand the image to twice its normal size.
- Default location of the digital zoom is in the center of screen. The zoom box can be moved each 10th step to left and right and 7th step up and down.
- To move the zoom box, use the [Arrow] button.
- To cancel the zoom box, press the [ZOOM] button once more.

3.7. Viewing with connected PTZ

- Pan/Tilt/Zoom (PTZ) devices can be controlled through the ELX16-240 when a PTZ device is connected and properly configured under “Serial Setup.”
- While in monitoring mode, press the [SELECT] button.
- Channel selection icon will be displayed.
- Move the icon to the channel to control with the [Arrow] button. (When controlling in single full screen, select the [SELECT] button.)
- Press the [MENU] button, then PTZ menu (Pan/Tilt, Zoom/Focus, Load Preset, Save Preset) will appear
- Press the [ENTER] button after selecting the desired function.



3.7.1. Controlling Pan/Tilt

To control Pan and Tilt during live image monitoring mode.

- Press the [SELECT] button. Move the “Select” icon to the desired channel.
- Press the [MENU] button.
- Select ‘Pan/Tilt’ from the PTZ Menu.
- Control pan and tilt function using the up, down, left and right arrows.

3.7.2. Controlling Zoom/Focus

To control Zoom and Focus during live image monitoring mode.

- Press the [SELECT] button. Move the “Select” icon to the desired channel.
- Press the [MENU] button.
- Select ‘Zoom/Focus’ from the PTZ Menu.
- Control zoom and focus functions using the up, down, left and right arrows of front panel.

3.7.3. Using Load Preset

To load preset for dome camera during live monitoring mode.

- Press the [SELECT] button. Move the “Select” icon to the desired channel.
- Press the [MENU] button.
- Select ‘Load Preset’ from the PTZ Menu.
- Press number button for desired preset on the front panel.

3.7.4. Using Save Preset

To set a new preset point for dome camera during live monitoring mode

- Move dome camera to the desired position using the ‘Pan/Tilt’ and ‘Zoom/Focus’ menus.
- Press the [SELECT] button.
- Press the [MENU] button.
- Select ‘Save Preset’ from the PTZ Menu
- Designate a number for the preset position by pressing a number button on the front panel.

3.8. Using Relay

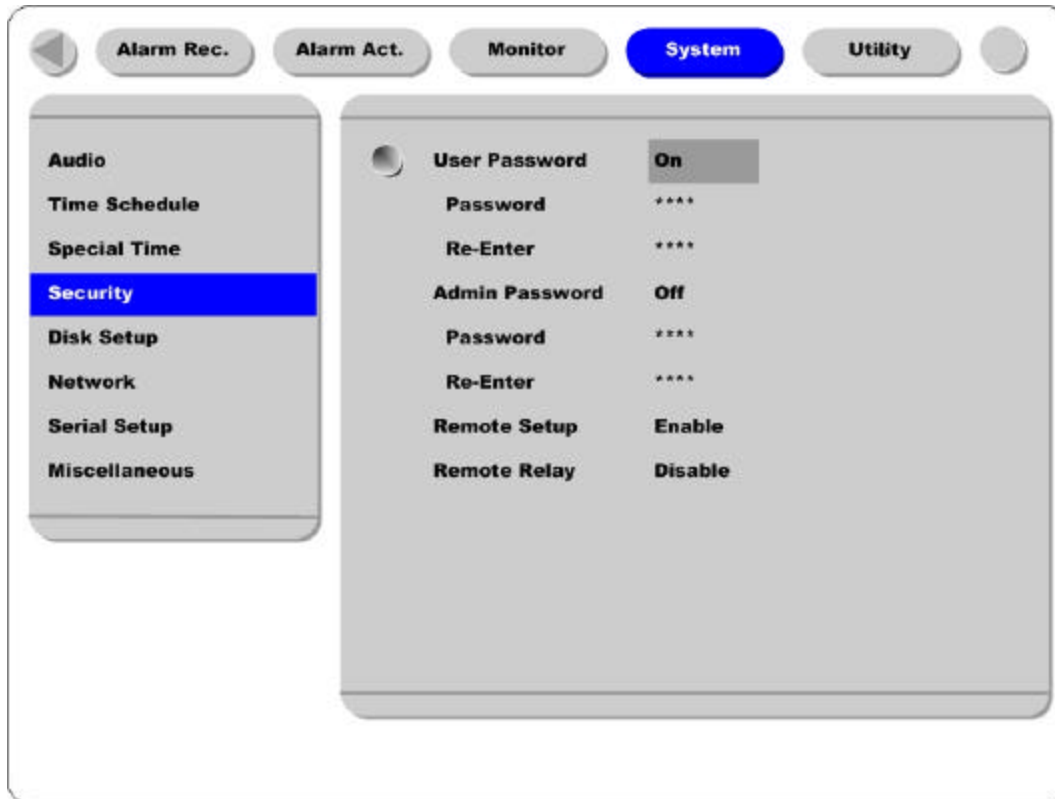
To set relay on/off. (ELX16-240 supports four relay outputs.)

- Press the [ACK/RELAY] button.
- The icon of “Relay On” shows on the screen.
- Press the relay number button between 1 and 4, and then the related relay out signal will be transmitted.
- In order to set relay off, press the [ACK/RELAY] button again.
- Then “Relay On” shows because relay keeps being set as on.
- Press the [ACK/RELAY] button again, and then the icon of “Relay Off” will show.
- Press the relay a number button to set off.

3.9. Using Screen Lock

To set screen lock against unauthorized user’s controlling when administrator isn’t on his desk.

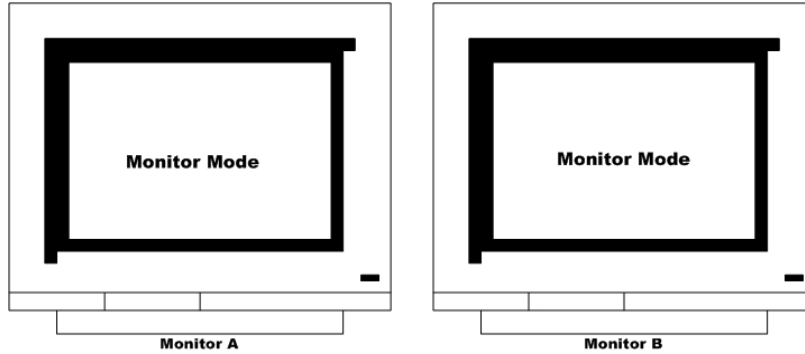
- For this function, user password should be set at first.



- If pressing the [EXIT/LOCK] button for 2~3 seconds, lock mode will run with showing “Screen Locked” message on the screen. When “User Password” is set as off, the message of “Enable user password first” shows on the screen.
- If lock mode runs, any function button will not be operated.
- In order to cancel lock mode, user password should be entered.

3.10. Using Monitor B

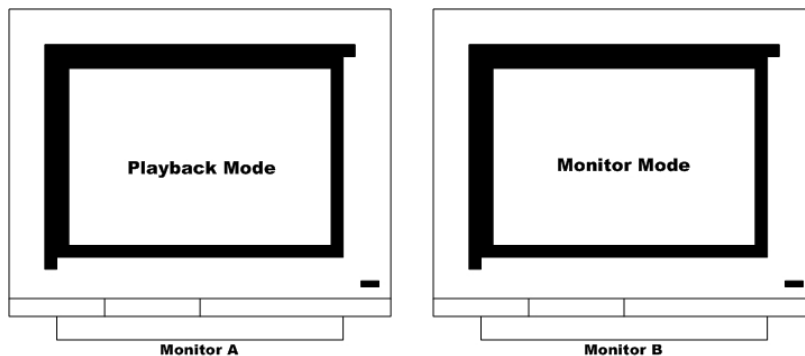
3.10.1. Monitoring



Monitor A is for monitoring multi channels, and Monitor B is for monitoring single channel. User can monitor channels as following examples.

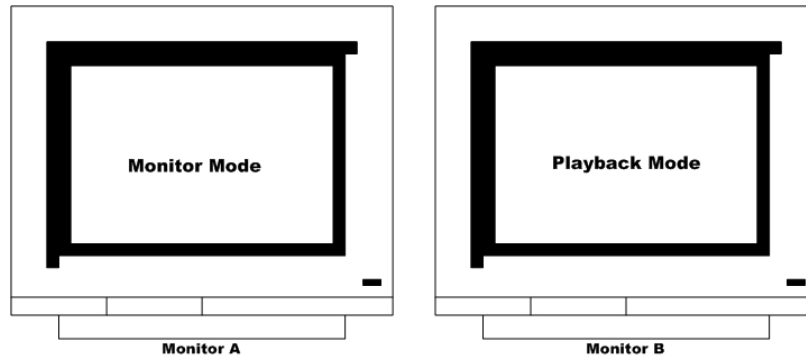
Monitor A	Monitor B	Remarks
16-split screen mode	1ch monitoring	When monitoring 16 channels in Monitor A, administrator monitors the important channel in Monitor B simultaneously.
13-split screen mode	User sequence	When monitoring 12 channels by 13-split screen mode in Monitor A, administrator monitors four channels by user sequence mode in Monitor B simultaneously.
Quad split sequence mode	1ch monitoring	When monitoring all channels by each quad split sequence mode, administrator monitors the important channel in Monitor B simultaneously.

3.10.2. Multi-channels playback



Administrator can search/playback multi-channels by split screen mode in Monitor A, and monitor 1 channel by single full screen in Monitor B simultaneously. Namely, administrator can monitor and playback with two monitors simultaneously.

3.10.3. 1 ch playback



Administrator can monitor multi-channels by split screen mode in Monitor A, and search/playback 1 channel by single full screen in Monitor B simultaneously.

4. Playback

It is to replay recorded images in full screen or a split screen (4/9/16) modes.

4.1. Playback via various mode

4.1.1. Playback via basic screen (full screen)

- Press the Play [] button in monitoring mode.
- Play [] button will begin playback of the last 30 seconds of recorded video at 1X speed.

<Note>

When pressing the play button in multi-monitoring mode, channel 1 is always the channel displayed. More specifically, images recorded on Channel 1 during the last 30 seconds are always displayed. However pressing the playback button in single-channel monitoring mode, will display the selected channel. To display another channel, press the corresponding number button on the front of ELX16-240.

4.1.2. Playback via a split screen (4/9/16)

- Press the [MULTI] button during basic (single-channel) playback mode.
- Channels 1 to 4 will be displayed in the quad-split screen.
- To display a single channel, press the corresponding number button on the front of the ELX16-240.

4.1.3. Playback ch5 to ch16 via quad-split screen

- Press the [SELECT] button in quad-split mode.
- Select a split position.
- If selecting a channel number, the related image is played in the position.

4.1.4. Playback with Digital Zoom

- Press the [ZOOM] button during the basic (single-channel) playback mode.
- Digital Zoom will expand the image to twice its normal size.
- Default location of the digital zoom is in the center of screen. The zoom box can be moved each 10th step to left and right and 7th step up and down.
- To move the zoom box, use the [Arrow] button.
- To cancel the zoom box, press the [ZOOM] button once more.

4.1.5. Various playback modes

- (PLAY)** : To begin playback mode and replay at 1x speed. After pressing PAUSE (), PLAY will advance recorded images frame by frame.
- (STOP)** : To stop replaying
- (PAUSE)** : To pause replaying
- (FFW)** : Each press of the button will increase playback speed gradually (x1, x2, x4, x8, x16)
- (FRW)** : Each press of the button will increase playback speed gradually (x1, x2, x4, x8, x16)
- STEP FORWARD** : Pressing [, PLAY] or [, FFW] button from PAUSE status, will replay image frame by frame. In order to go back to normal playback mode, press [, STOP] button then press [, PLAY] or [, FFW] button.
- STEP REWIND** : Pressing [, FRW] button from PAUSE status, will replay image frame by frame. In order to go back to normal playback mode, press [, STOP] button then press [, PLAY] or [, FFW] button.

4.2. Using Search Mode

Search Mode is used to search and play specific data directly in playback mode. Data can be searched by specific Time and Date or by the Event Log browser.



<Button control>

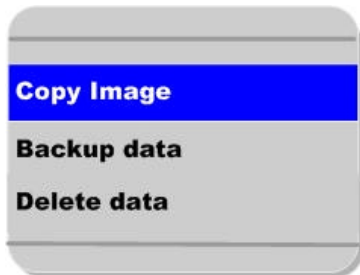
- Press the [SEARCH] button in playback mode.
- Search for data by entering Date/Time or by selecting an event from the Event Log browser.
- Press the [ENTER] button after entering the desired Date/Time or selecting Event from log.
- The selected images will begin to playback.
- To exit from search mode, press the [EXIT] button.

<Note> Using Log Browser

1. To move to the previous/next page, press the "Left" or "Right" buttons.
2. To move to previous log entry, press the "Up" button.
3. To move to next log entry, press the "Down" button.

4.3. Copy / Backup / Delete Data Manager

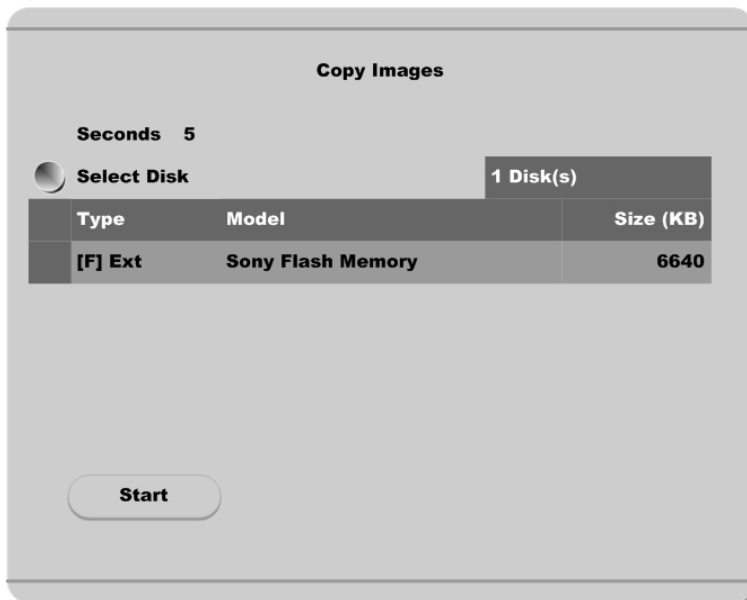
To copy/backup/delete the recorded data. This menu is activated during playback mode.



- Press the [SELECT] button and [MENU] button in Playback mode.

4.3.1. Copy Data

To copy a specific data with USB memory stick.



Seconds

To designate copy range between 1 and 60 seconds.

Select Disk

Select copy disk.

4.3.2. Backup Data

Backup Manager

Start Date 2003/04/01 **Time** 10:12

End Date 2003/04/01 **Time** 11:12

Select Disk 1 Disk(s)

	Type	Model	Size (KB)
<input checked="" type="checkbox"/>	Ext	Maxtor 4R08010	80043264

Start

Start Date & Time / End Date & Time

To designate backup range.

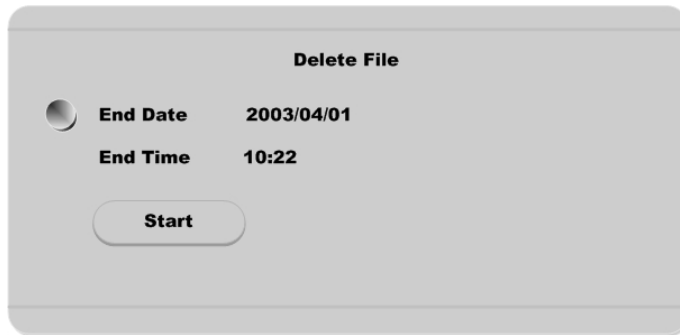
Select Disk

To select which storage will be used as backup device. To change the disk status, use the “Disk Manager” menu under the “System” tab.

<Note>

Backup Manager does not support USB devices. Backup Manager will ONLY work with devices connected through IEEE1394 / FireWire ports.

4.3.3. Delete Data



To delete a specific file range from the current recording HDD. This menu does not affect backup disk. The beginning of the range is always the beginning of the recording on the HDD.

<Note>

The block unit of DVR's file system is 64MB, and DVR deletes by block. So data may not be deleted correctly, even though time is designated.

5. Configuration

5.1. Quick Setup

There are three menus for recording setup; Quick Setup, Normal Recording, Alarm Recording menu in Configuration Menu. Quick Setup is the easiest set-up, activating all eight analog cameras to record with the same settings and conditions. Normal recording is the standard recording settings and can be customized based on time and channel. Alarm recording is the recording schedule based on alarm conditions (Motion Detection, Sensors, etc.) Also, Quick Setup has time setting menu.

5.1.1. Date/Time

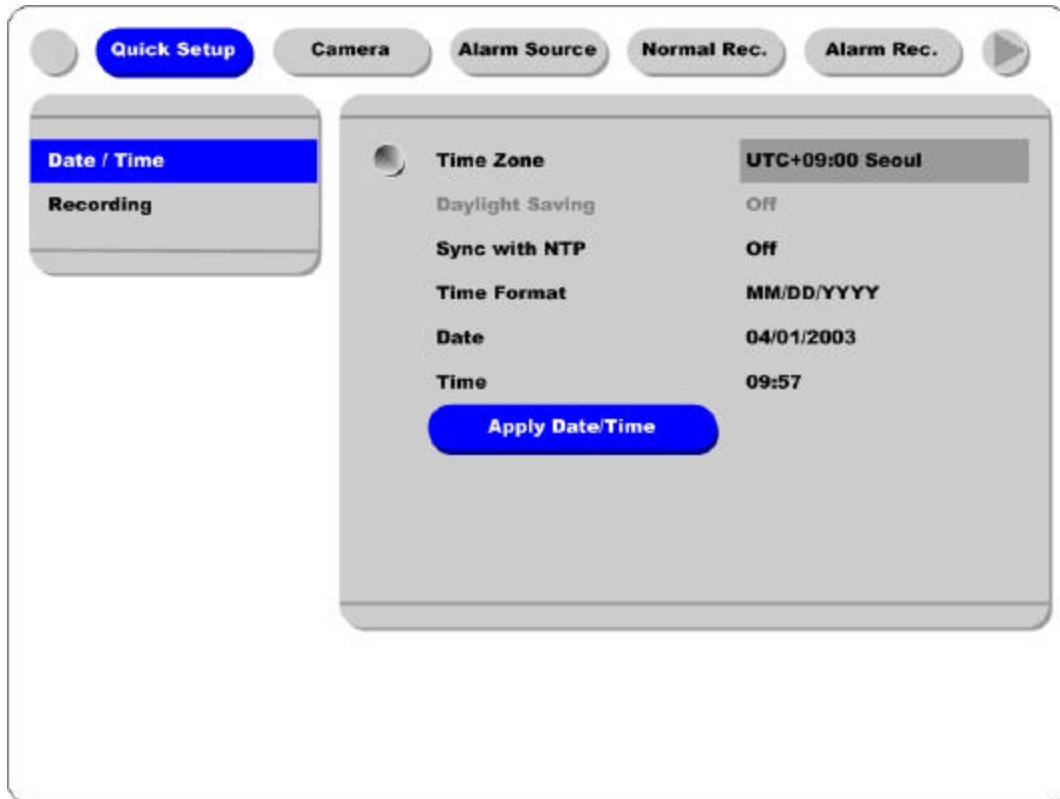
When ELX16-240 is manufactured in factory, time zone will be set as “UTC 00:00 Dublin”.

Set the time to local time zone

Changing ELX16-240 time may cause time conflict with recorded images. In this case, it is strongly recommended to re-format the hard drives after making changes.

<Button control>

- Press [MENU] button on ELX16-240 front panel.
- Move to “Quick Setup” menu (First tab on the Configuration menu).
- Move to “Date/Time” below “Quick Setup” using downward arrow button on ELX16-240 front panel.
- Press the [ENTER] button on ELX16-240 front panel.
- Set time. (The following picture will be displayed when setting time menu)
- In order to access each menu, press [ENTER] button after selecting it with upward/downward arrow button on ELX16-240 front panel.



Time Zone

Set the time zone using the left/right arrow button on ELX16-240 front panel. Every time you press left/right arrow button, time zone will change. Select the desired time zone. (To move to the previous menu, press [EXIT] button on ELX16-240 front panel.)

Daylight Saving

The Daylight Savings option is linked to Time Zone. Daylight Savings is only activated for time zones that use Daylight Savings. For example, selecting GMT – 7:00 Arizona will disable the option for Daylight Savings because Day light Savings is not used in Arizona. This menu is linked with “Time Zone” menu. Namely, if selecting daylight saving area in time zone, this menu will be activated. Oppositely if selected time zone is not enforced, it will not be. It is based on MS Windows. So this menu is for setting whether you apply ON/OFF (with left/right arrow button on ELX16-240 front panel) in daylight saving area.

Sync with NTP

It is to synchronize time with NTP (Network Time Protocol) server.

<Note>

For more detailed information about NTP setting, please refer to the “Network Configuration” (System → Network → NTP Settings).

Time Format

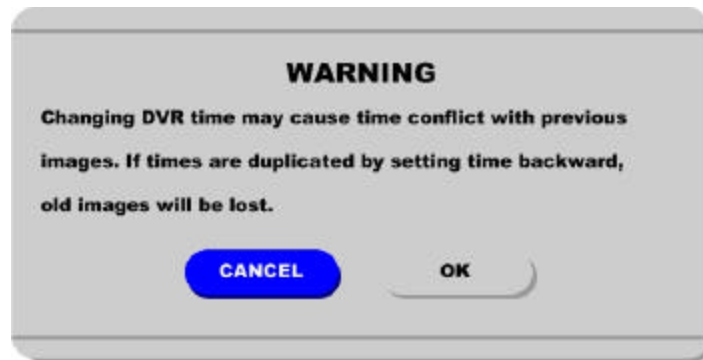
Set the time format between “MM/DD/YYYY” and “YYYY/MM/DD” using the left/right arrow button on ELX16-240 front panel.

Date/Time

Set date and time. To move from Month to Day to Year/Hour to Minute, use the left/right arrow buttons. To select each month, each day, etc, use the up/down arrow buttons.

Apply Date/Time

Press this button to confirm the above settings. An window will pop-up warning of the possibility of time conflict with recorded images. It is strongly recommended to format the HDD after making changes to the time menu.

**<Note>**

Most setting values are applied automatically, when exiting from the related menu page. But “Date” & “Time” settings are not applied automatically because they may critically affect the file system of the recorded HDD. To apply Date/Time settings confirm settings with [**Apply Date/Time**] button.

5.1.2. Recording

Its recording values are applied to all 16 channels for all time periods.



<Button control>

- Press [MENU] button and select to “Recording “ from the “Quick Setup” tab.

Configuration Status

Displays the recording set up status. If recording is configured with the Quick Setup, “Macro Setup” will be displayed. If recording is configured with the “Normal” and “Alarm” recording, “Custom Setup” will be displayed.

<Note>

When all 16 analog cameras' normal recording conditions are set identically, the status is marked as 'Macro Setup'. Otherwise, it is marked as 'Custom Setup'.

Channel Status

When “On,” all eight analog channels will record based on the Quick Setup settings.

Recording Speed/Quality

There are five conditions (No Rec./Low/Standard/High/Custom).

All conditions except “Custom” will synchronize “Speed (ips)” and “Quality” automatically; “Low” setting is 1ips/Q5; “Standard” setting is 5ips/Q5; “High” setting is 15ips/Q5. When using the “Custom” setting, Speed (ips) and Quality can be set separately.

Audio Recording

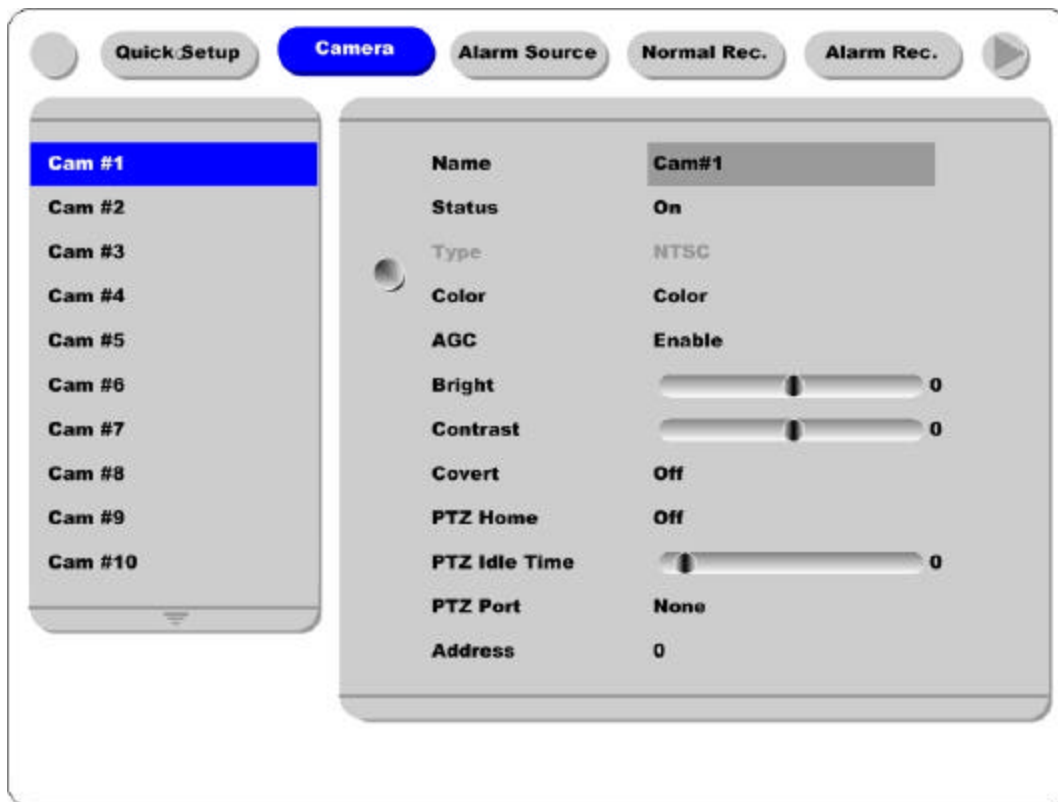
Enables the audio recording feature. If audio is set as “On,” and “Audio Synch with” is set as “All” (in the “Audio” menu under the “System” tab) audio will be available in Playback Mode with all channels .

Apply

Confirms the Quick Setup Recording settings. ELX16-240 will begin recording after pressing the “Apply” button and exiting from the recording menu.

5.2. Camera

This menu is for configuring individual cameras. In Quick Setup, camera status is automatically set as “On.” Settings such as Brightness and Contrast can be set for each channel. The values assigned will apply for both monitoring and playback modes.



<Button control>

- Press [MENU] button and use the [ARROW] keys to move to each channel below the “Camera” tab.

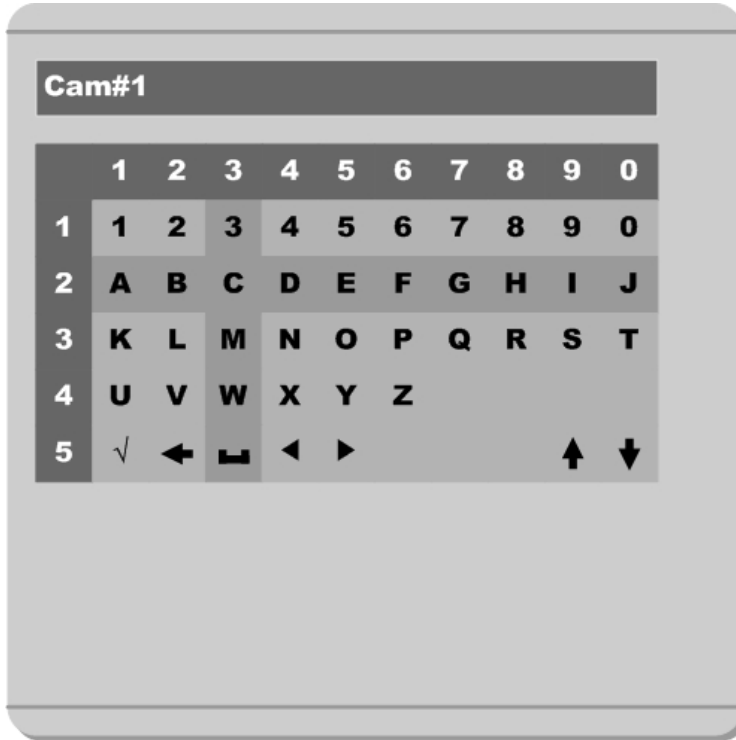
Name

Assign a customized name to the channel.

Press [ENTER] to open the necessary dialogue box.

<TIP>

When assigning a name to a channel, the following dialogue box will appear. This box is also used later in the system, but the method is always the same.



- To select a letter, use the [ARROW] (and) buttons or the number buttons on ELX16-240 front panel; "0" to "9". When using the [ARROW] buttons, use the [PLAY] () button to select each choice.

- The intersection between the horizontal and the vertical bar is the selected choice.

- Press the button to confirm the selected value.

- Or enter the related numbers in order of horizontal/vertical. (For example, in order to select "C", press [3] and [2] button.)

- After setting all values, press the [Exit] button.

- Function Key

✓ : Enter

← : Back Space & delete

⏏ : Space

← : Left

→ : Right

↑ : Previous Code Page

↓ : Next Code Page

Status

Set “On/Off” using the or buttons after pressing the [ENTER] button.

Type

Just displays the video-input signal. It is set with jumper switch inside of ELX16-240.

Color

Set “Color/ B/W” using the or buttons.

AGC (Auto Gain Control)

Set “On/Off” using the or buttons after pressing the [ENTER] button.

Brightness/Contrast

Set the value between -9 and +9 using the or buttons.

Covert

If setting “Covert” as “On”, channel will be hidden in monitoring mode.

Set “On/Off” using the or buttons after pressing the [ENTER] button.

PTZ Home/PTZ Idle Time

If there is not any movement during "PTZ Idle Time", the camera will move to the already desingnated preset point.

Set the preset number and time with using the or buttons.

PTZ Port

Set the value using the or buttons.

Address

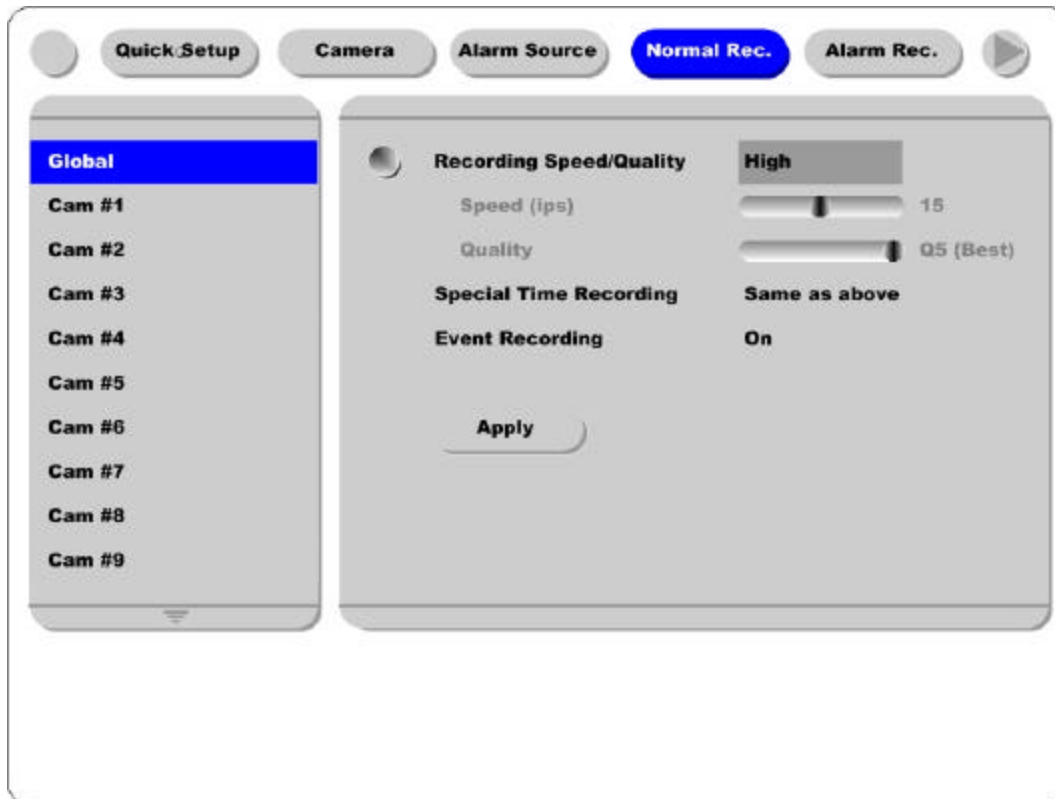
Press the [ENTER] button to open the dialogue box.

5.3. Normal Rec.

This menu is for configuring the normal recording settings based on channel and timetable. If this menu is configured Quick Setup, the previous Quick Setup values will be replaced by the Normal Recording settings.

5.3.1. Setting Global

It is similar to Quick Setup's recording setting. It is for setting all channels by same conditions.



<Note>

1. Differently from Quick Setup's recording condition, global setting doesn't have "Audio Recording" menu and have "Special Time Recording" and "Event Recording" menus.
2. To confirm the configured values, you should press the "Apply" button.
3. For more information, please refer to the following "Setting by channel".

5.3.2. Setting by channel



Time Schedule

Each camera can be set to record based on four time schedules; Weekday (Day) / Weekday (Night) / Weekend (Day) / Weekend (Night). Each schedule can be configured under the "System" tab.

<Setting Time Schedule >

In order to set time schedule, move to "System" menu.

**Weekday Start/End**

Press [ENTER] to access the Time Setting. Set the range for "Weekday" between Monday and Sunday using the or buttons. "Weekend" is set automatically based on "Weekday" range.

Day Start/End

Set the range for "Day" using the up/down buttons. The "Night" range is set automatically based on "Day" range.

Recording Speed/Quality

There are five conditions; No Rec./Low/Standard/High/Custom.

All conditions except "Custom" synchronize "Speed (ips)" and "Quality" automatically; "Low" setting is 1ips/Q5; "Standard" setting is 5ips/Q5; "High" setting is 15ips/Q5. When using the "Custom" setting, Speed(ips) and Quality can be set separately.


Special Time Recording

This menu is to designate different recording conditions during “Special Times.” “Special Time” is designated under the “System” tab.

There are five conditions; No Rec./Low/Standard/High/Same as above.

<Setting Special Time>

To set "Special Time," move to "System" tab.



Zone	Recording Condition	Status	Time
Zone1	00:00	-	00:00
Zone2	00:00	-	00:00
Zone3	00:00	-	00:00
Zone4	00:00	-	00:00

Up to four zones can be designated as “Special Time.”

Event Recording

Press the [ENTER] button to access the Event Recording feature. Set “On/Off” using the or buttons.

Event recording condition is set under the “Alarm Recording” tab.

This setting is used to configure the ELX16-240 to record data according to an alarm condition, such as Motion Detection (MD), sensors, etc.

5.4. Alarm Rec.

This menu is to configure for the settings for alarm recording conditions. To activate this schedule, set “Event Recording” under the “Normal Recording” tab to “On.”

And “Alarm Source” should be set before alarm recording menu.

5.4.1. Setting sensor

It is for setting sensor type. DVR supports Normal Open(N.O.) and Normal Close(N.C.) types.



Global

To set all sensors by same conditions. Select one among “Off/N.O./N.C.”, and press the “Apply” button.

Configuration

To set each sensor separately.

5.4.2. Setting Motion Detection

It is for setting each MD condition per channel. “Global” means to set all channels by same MD condition. And it is possible to set each channel separately



Motion Detection

Choose from among four sensitivity conditions; Off, Low, Standard, and High.

MD Area

Customize the MD area among 64 sectors (8 sectors x 8 sectors).

Default value is “Select All”. Select “Custom Area” to move to setting page.

Include Video Loss

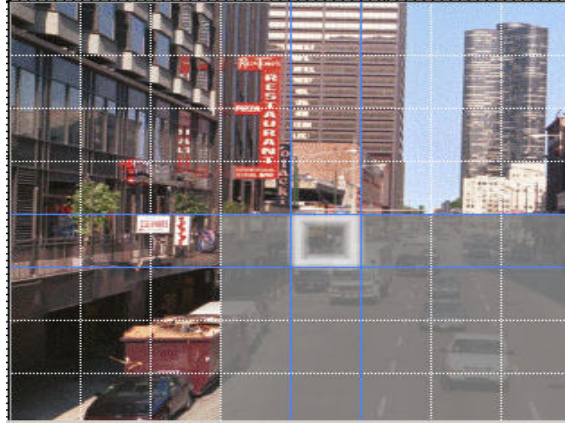
Set whether no video situation is set as MD or not.

<Note>

After setting it as “Global”, press the “Apply” button certainly.

<Setting MD Area>

Designate a specific area for motion detection triggered event.

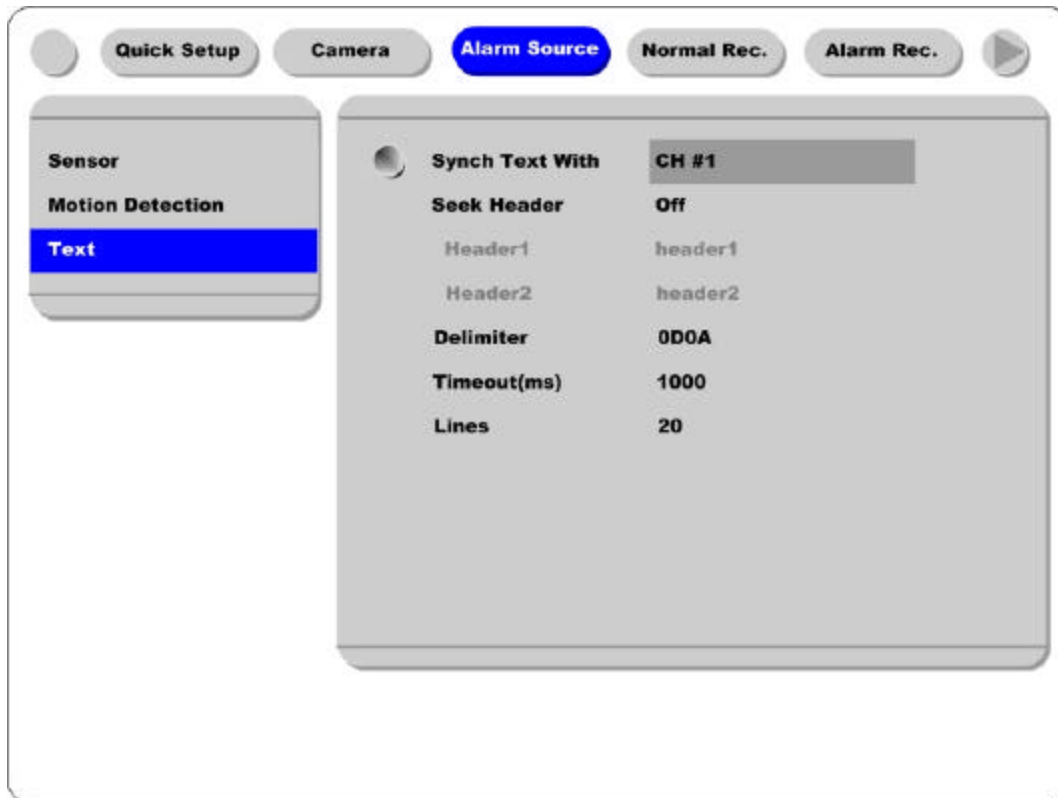


Press the “Custom Area” button, to customize the motion detection area. The area is divided into 64 blocks (8 x 8).

Selected MD area is indicated in dark gray. To remove blocks from motion detection, select the block using the [ARROW] buttons and press the [ENTER] button. Press the [EXIT] button when finished.

5.4.3. Text

ELX16-240 can display and playback text data of Access Control/POS/ATM with relevant video. This menu is to set input text information. For text recording, “COM1” part should be also set in “System→Serial Setup” menu.



Sync Text With

To set channel to synchronize with text.

Seek Header

If a protocol is built in ELX16-240 like Star Finger 007, this setting is needless. Otherwise, ELX16-240 can't recognize which parameter value is input to ELX16-240. Namely, all information has starting point and ending point. Header means starting point that is always inserted. So when this header data is transmitted to ELX16-240, ELX16-240 can recognize it as starting point. Two headers can be set maximally.

Delimiter

Because delimiter value may be different, refer to the manual of related device.

Timeout(ms)

The following “Lines” means maximal text line that can be included within a data. However length of each data may be different. Because ELX16-240 can't recognize it automatically, timeout menu is needed. Namely, if specific time passes after ELX16-240 receives the last line, ELX16-240 will regard it as normal data and decide to record.

Lines

To set maximal line of a data.

5.4.4. Setting global alarm recording

It is to set all analog channels by same condition.



Sensor/MD

Set the co-work of sensor/MD.

Pairing means channel runs sensor/MD by 1 to 1.

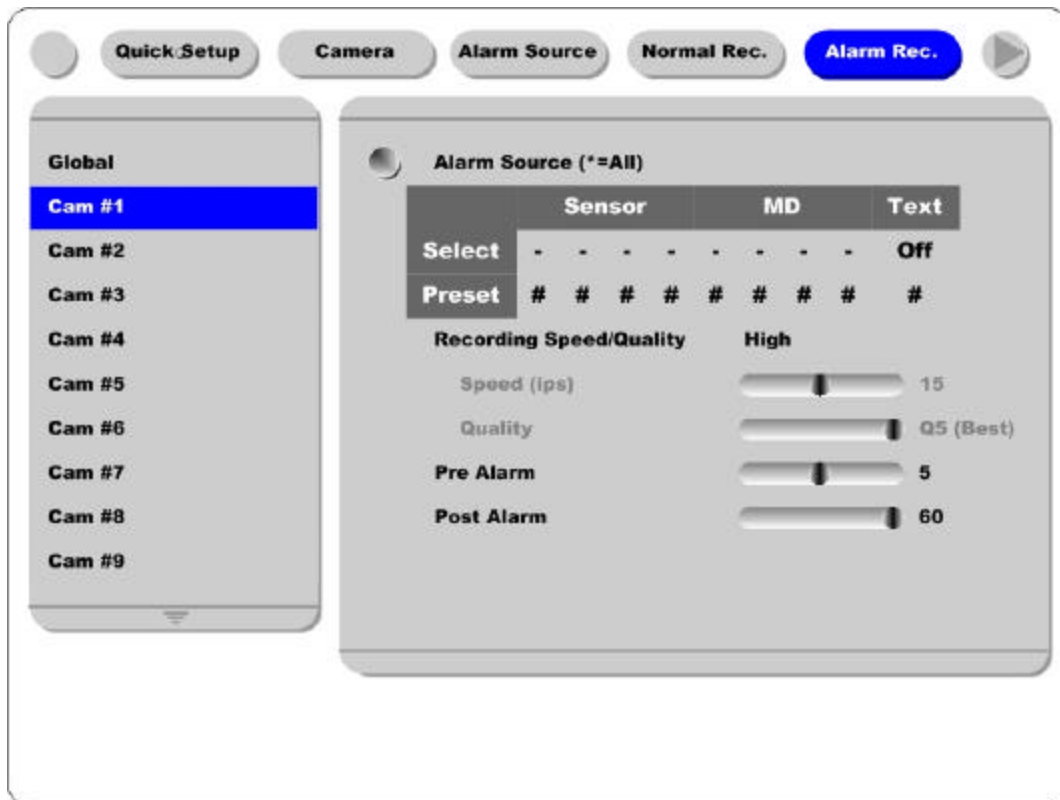
Text

In order to display or record text with image, it should be set as "On".

<Note>

1. After setting it as "Global", press the "Apply" button certainly.
2. For more information, please refer to the following "[Setting by channel](#)".

5.4.5. Setting by channel



Alarm Source (*=All)

- With “Alarm Source” menu, it is possible to select upto 4 sensor/MD and text input.
- For setting sensor/MD, press the related number button.
- Set text as “On/Off” with [ARROW] button.
- Set a PTZ preset position according to alarm input.

Recording Speed/Quality

There are four conditions; Low/Standard/High/Custom.

All conditions except “Custom” synchronize “Speed (ips)” and “Quality” automatically; “Low” setting is 1ips/Q5; “Standard” setting is 5ips/Q5; “High” setting is 15ips/Q5. When using the “Custom” setting, Speed (ips) and Quality can be set separately.

Pre Alarm (sec)

Set a value up to 10 seconds to record video Pre-Alarm.

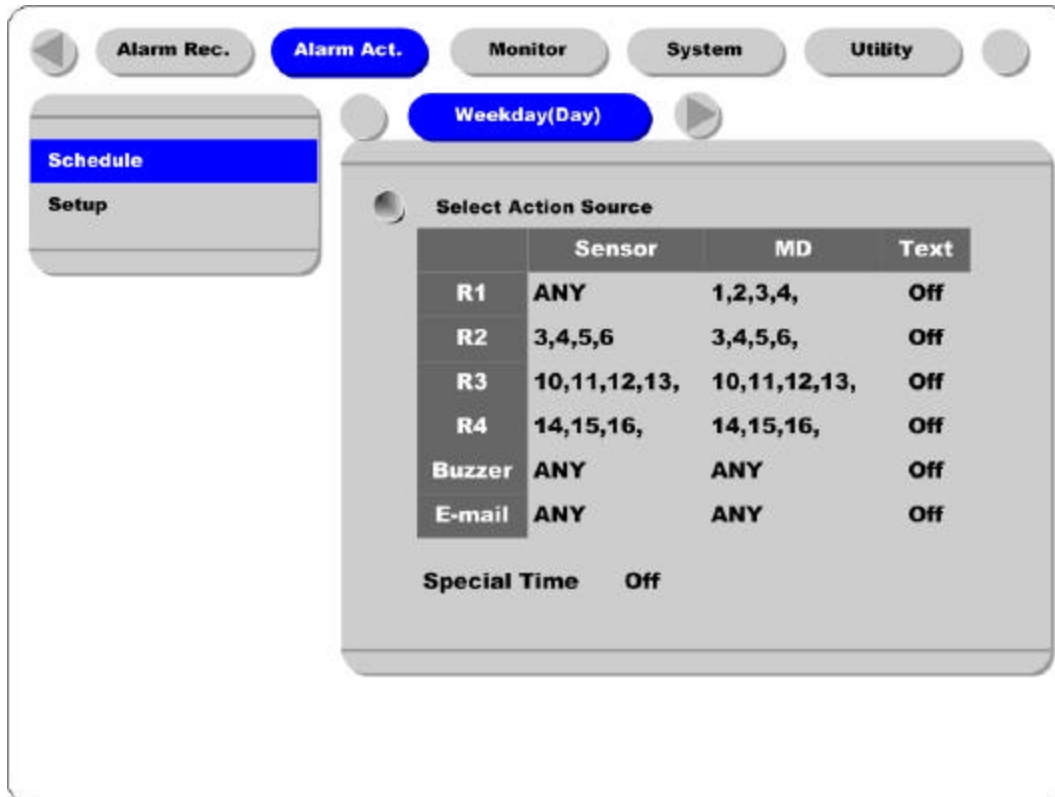
Post Alarm (sec)

Set a value up to 60 seconds to maintain recording conditions Post-Alarm.

5.5. Alarm Act.

it is to set relay command as each time schedule; *Weekday(Day)*, *Weekday(Night)*, *Weekend(Day)*, *Weekend(Night)*. In order to make alarm action run after setting schedule, *Relay*, *Buzzer*, and *E-mail* should be also configured.

5.5.1. Schedule



Select Action Source

In the menus of Relay1~Relay4, Buzzer, and E-mail, Sensor or MD can be set upto 4EA or ANY. And Text can be set as “On/Off”.

For selecting sensor/MD, press the channel number to set.

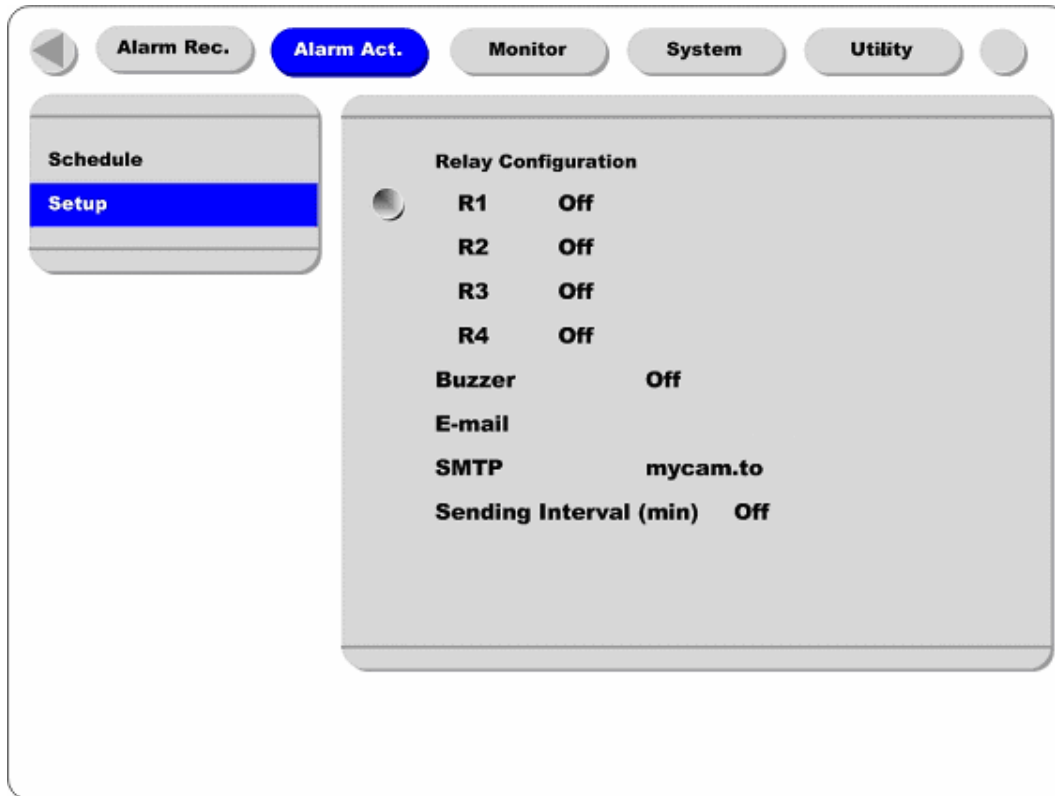
Special Time

Enable “Special Time” in order to apply the relay schedule to the Special Time Zone.

<Note>

1. “Global” means to set all time schedules by same condition.
2. After setting it as “Global”, press the “Apply” button certainly.

5.5.2. Setup



Relay Configuration

Enables R1~R4.

Buzzer

Enables an alarm buzzer when an alarm (MD or sensor) is triggered.

E-mail

Enters E-mail address to receive alarm information.

SMTP

Enters DNS of mail relay server.

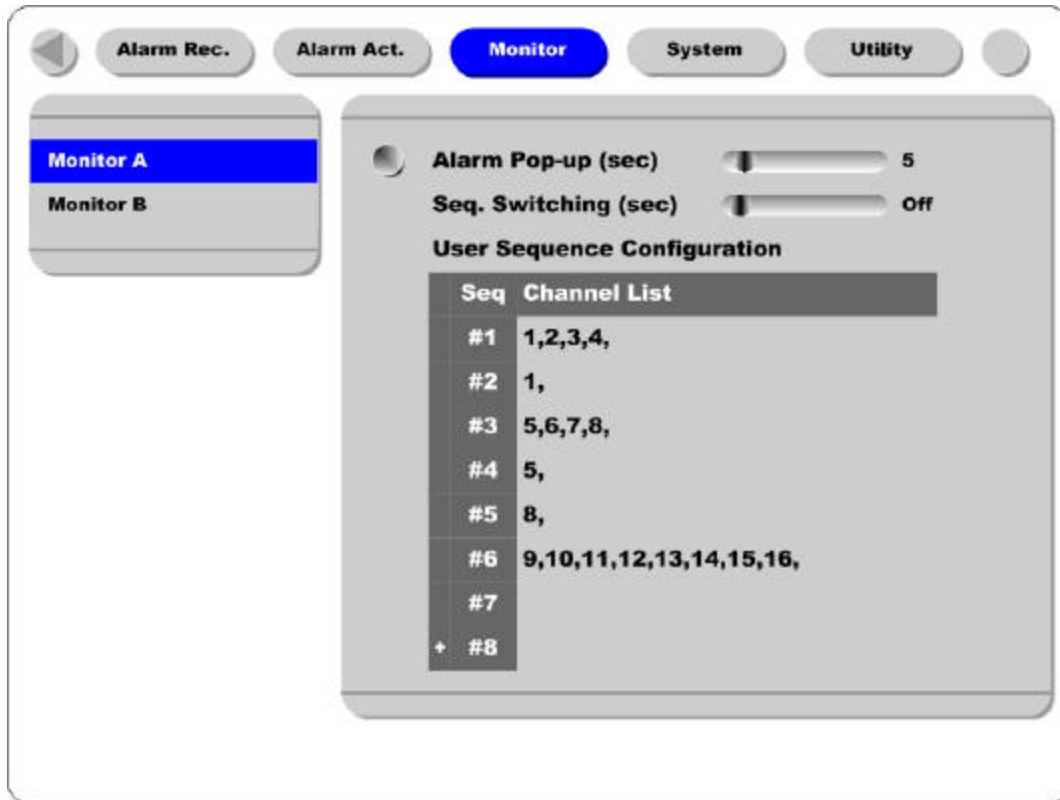
Sending Interval (min)

<Note>

For using E-mail function, DNS should be set in Network configuration.

5.6. Monitor

This menu is to set display image on monitor A & monitor B.



Alarm Pop-up (sec)

To set alarm pop-up screen. Pop-up duration time can be set between 5 and 10 seconds. If setting as “Keep”, pop-up screen keeps holding. In order to cancel Keep mode, press another channel button.

Seq. Switching(sec)

To set sequence time between 1 and 60 seconds.

<Note>

If channel 1 pops up and channel 2 also pops up during pop-up hold time, screen is changed to quad-split screen and channel 1 and 2 are shown. And the pop-up hold time is extended automatically. (Up to 8 channels)

User Sequence Configuration

To set user sequence mode.

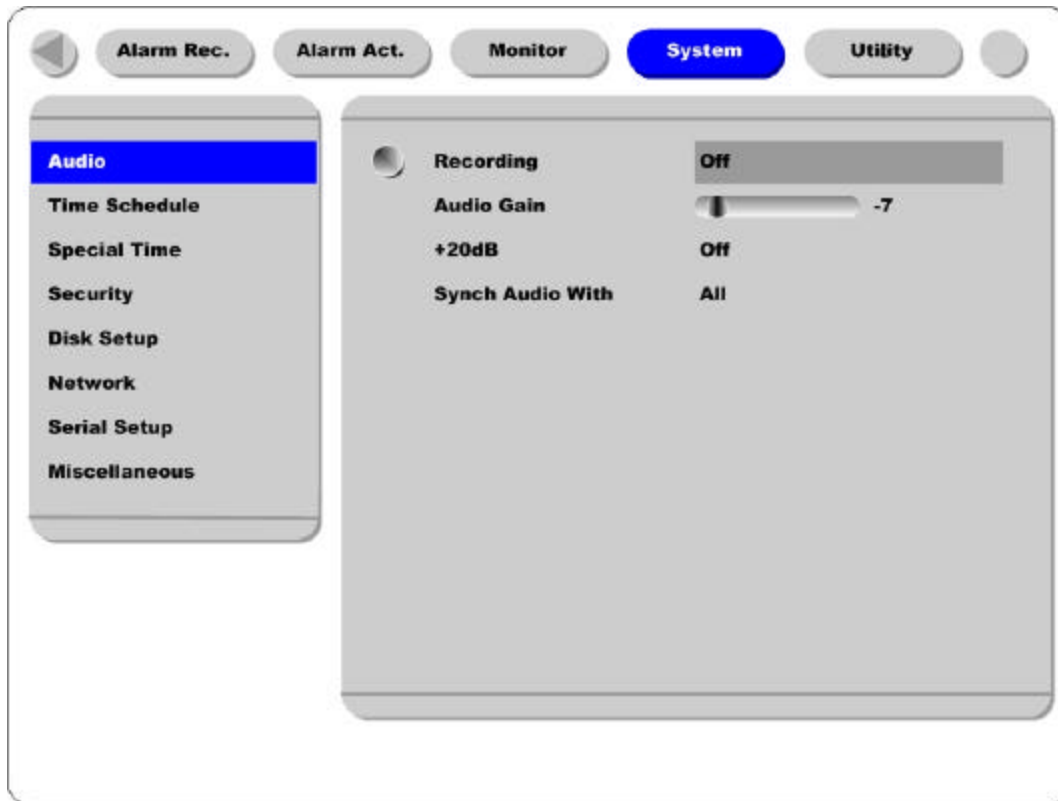
<Note>

1. User sequence mode can be set upto #16.
2. The example above shows 6 sequence sets; Quad split screen(1,2,3,4) → Single full screen(1) → Quad split screen(5,6,7,8) → Single full screen(5) → Single full screen(8) → 9-split screen(9,10,11,12,13,14,15,16)

5.7. System

5.7.1. Audio

ELX16-240 supports 1 channel audio input. This single audio channel can be replayed with any connected channel or with all of them.



Recording

Set to “On” using the [ENTER] button and the [ARROW] buttons to record audio.

Audio Gain

Increases or decreases the sensitivity to the audio signal. Can be set between -7 and $+8$.

+20dB

To amplify the audio input signal. Should ONLY be used when using an external microphone.

Sync Audio with

Designate which channel(s) to synchronize audio with during playback.

5.7.2. Time Schedule

To designate Weekday/Weekend and Day/Night.



Weekday Start/End

Press [ENTER] to access the Time Setting. Set the range for “Weekday” between Monday and Sunday using the or buttons. “Weekend” is set automatically based on “Weekday” range.

Day Start/End

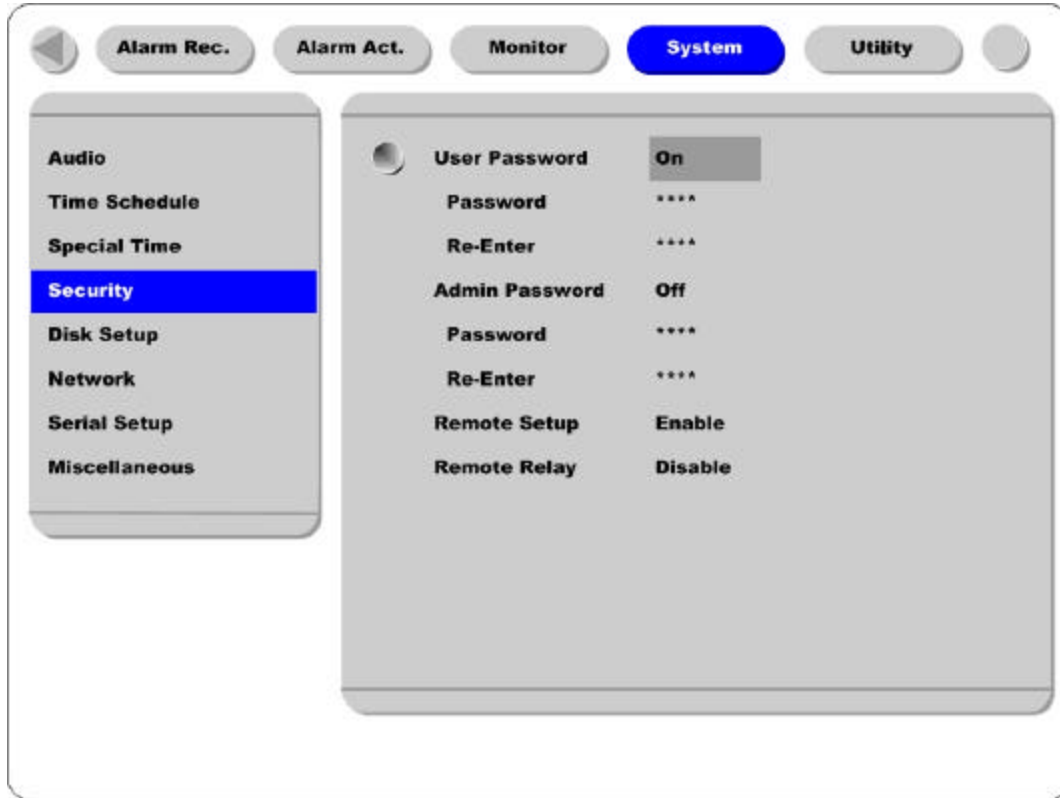
Set the range for “Day” using the up/down buttons. The “Night” range is set automatically based on “Day” range.

5.7.3. Special Time



Up to four zones can be designated as "Special Time."

5.7.4. Security



User Password

Designate a User's Password for access to monitoring and playback. Default password is "0000".

Admin Password

Designate an Administrator's Password to control access to Configuration Menu and full system control authority. Default password is "9999".

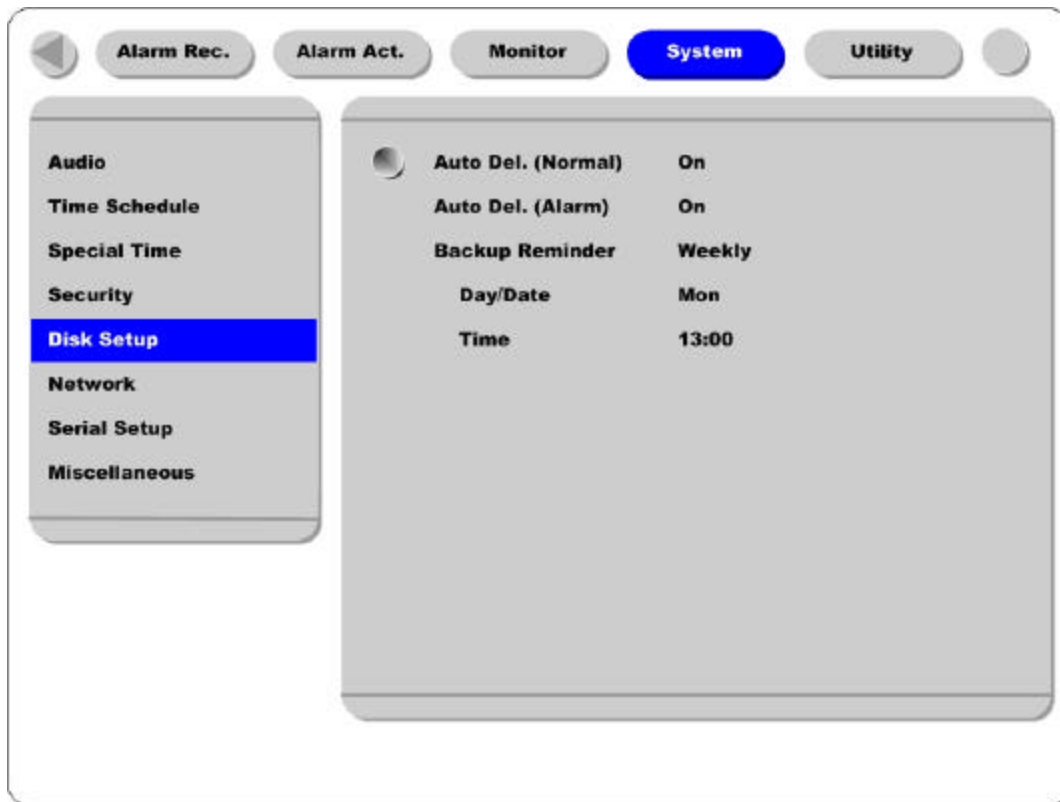
Remote Setup

When set to "Enable," users can configure ELX16-240 through the S/W interface from a remote site via network.

Remote Relay

Enables access to the "Relay" menu from a remote site.

5.7.5. Disk Setup



Auto Del. (Normal)

Images and data recorded under the “Normal” condition are automatically deleted as the hard-drive(s) reaches capacity. Images are written over based on a first-in first-out basis. Images recorded based on “Alarm” conditions are not written over.

Auto Del. (Alarm)

If enabled, all images, “Normal” and “Alarm,” will be written over based on a first-in first-out basis.

Backup Reminder

A Backup Reminder can be set to remind users to backup the HDD. The reminder can be set to appear daily, weekly, or monthly.

Day/Date/Time

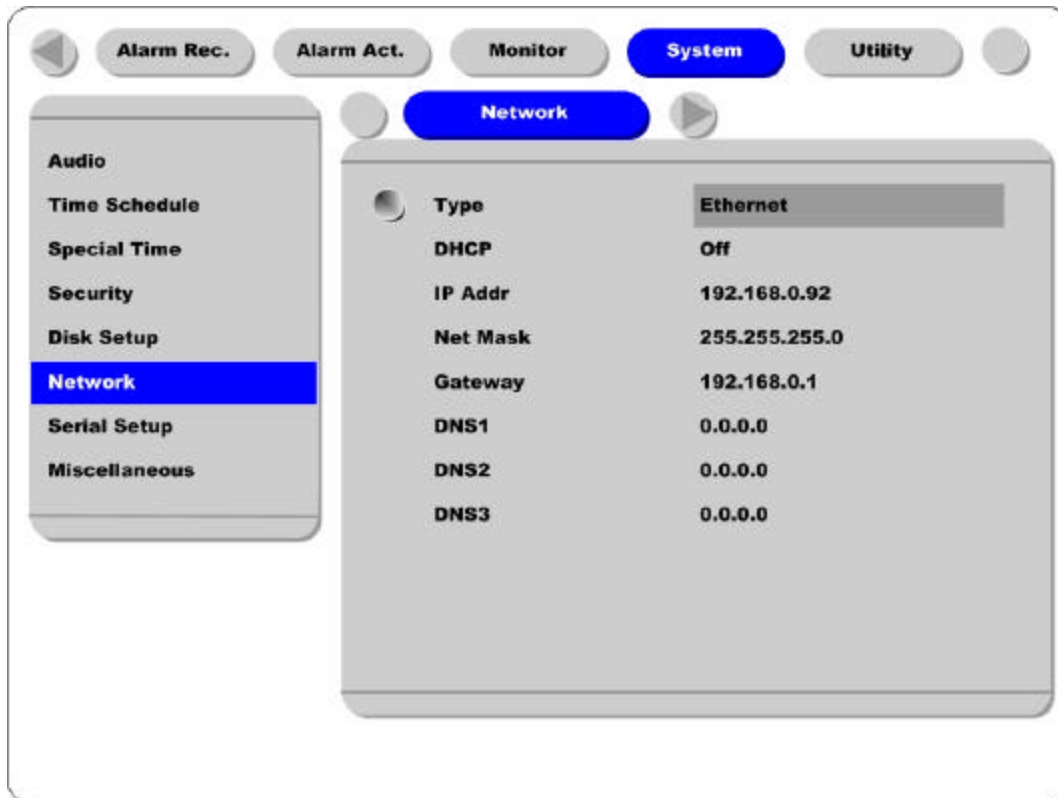
To set the time for the Backup Reminder.

5.7.6. Network

There are five sub-menus; Network, xDSL, HRS, Port Setting, and NTP Setting.

5.7.6.1. Network

This page is to define network type and set network addresses for ELX16-240.



Type

This is to select proper network interface (Ethernet/xDSL) with which ELX16-240 is connected. If ELX16-240 is connected with Internet dedicated line, cable modem line or on LAN environment, select network interface as 'Ethernet.'

If ELX16-240 is connected on xDSL line that needs PPPoE process to connect to the Internet, administrator should select 'xDSL.' However, if the xDSL line does not need PPPoE process, administrator should select 'Ethernet,' even though ELX16-240 is connected on xDSL line.

DHCP

Basically, this menu is for the lines that have Ethernet interfaces such as Internet dedicated line, cable modem line and LAN. If administrator activates 'DHCP' menu, all addresses are set automatically by ELX16-240 detecting them from DHCP server of your ISP. The detected addresses are not displayed on the screen. The addresses do not need to be entered manually unless 'DHCP' is disabled.

DHCP can also be used for xDSL (PPPoE) interface. Sometimes, all computers on a Local Area Network (LAN) share a single Floating / Dynamic IP address. In this case, the ELX16-240 should be assigned a private IP address and have DHCP enabled. Users on the LAN can connect to the ELX16-240 using the private IP address and outside users can connect to the ELX16-240 over the Internet.

IP Address, NetMask, and Gateway Address, DNS

Administrator may configure IP address, subnet mask, gateway address, and DNS addresses of ELX16-240.

5.7.6.2. xDSL

If ELX16-240 is connected on xDSL line and needs PPPoE process, the network administrator should configure the user ID and password for PPPoE. ID. The password may be acquired from the ISP that installed the line. Once configured, the ELX16-240 will receive an IP address when it is connected on xDSL line.



User ID/Password

When ELX16-240 is connected to xDSL, access ID and Password should be entered.

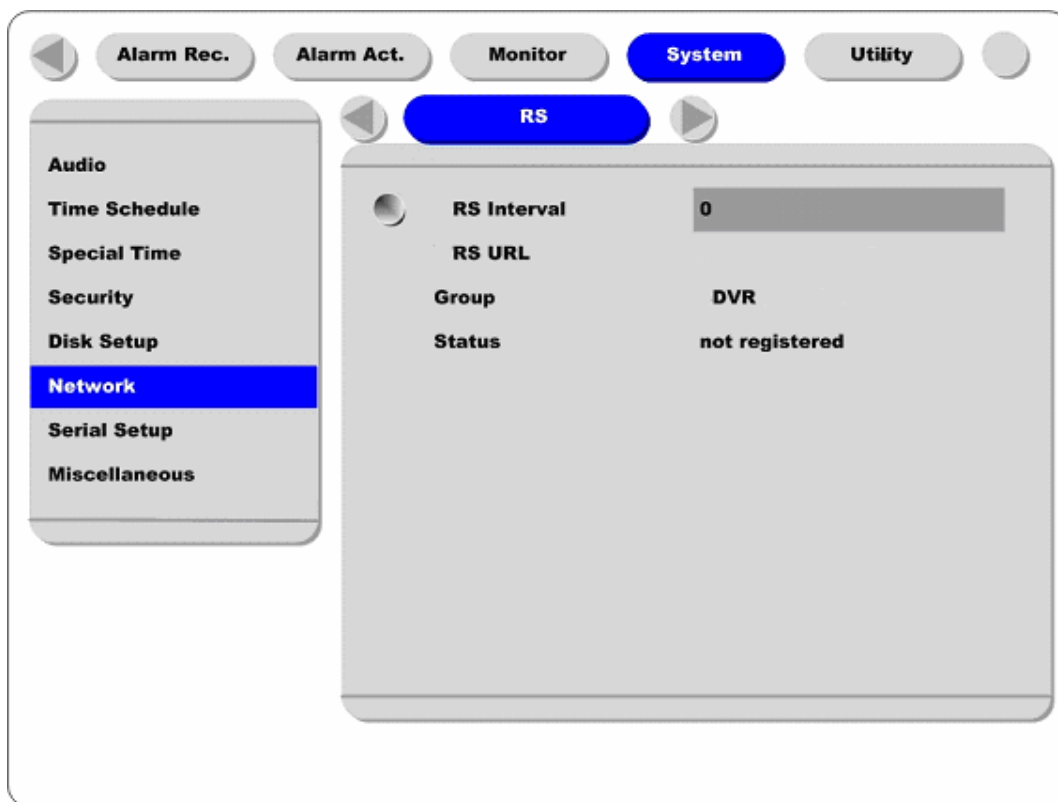
Status

Displays the ELX16-240 connection status.

5.7.6.3. HRS

When a ELX16-240 is installed under the environment of Cable Modem or xDSL Modem connection, its IP address changes whenever it reconnects to the Internet Service Provider (the ELX16-240 has a Dynamic or Floating IP address). In this case users who don't know the changed IP address cannot get access to the ELX16-240. ELX16-240 with dynamic IP should be registered to the HUNT Registration Server (HRS) server in order to make it easy for users to find the changed IP address, when they want to access the ELX16-240.

To register dynamic IP address to HRS, configure the descriptions below. If using xDSL modem or Cable modem, configuration should be the same.



HRS Interval

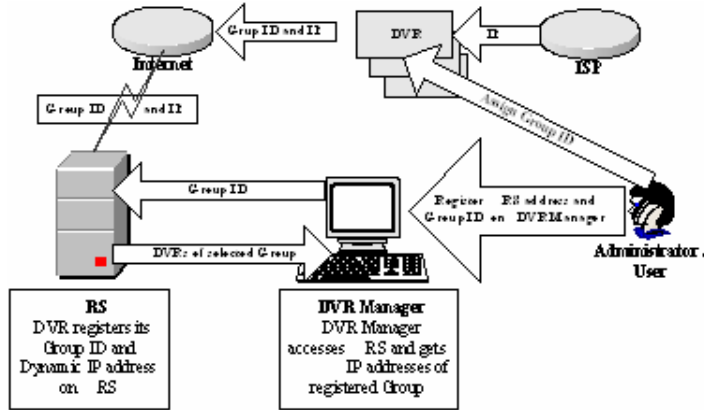
HRS Interval should be set by second. This designates the frequency the ELX16-240 will update information to the HRS. It is recommended to set as 3600 seconds. If the HRS received too many updates, it may close the connection to the unit. The HRS maintains registered units on the server list for two days. If no signal is received before two days, the HRS will delete the unit from the register.

HRS URL

This is to configure a server address for registration. HRS address of Rugged CCTV. is 210.116.114.37

Group ID

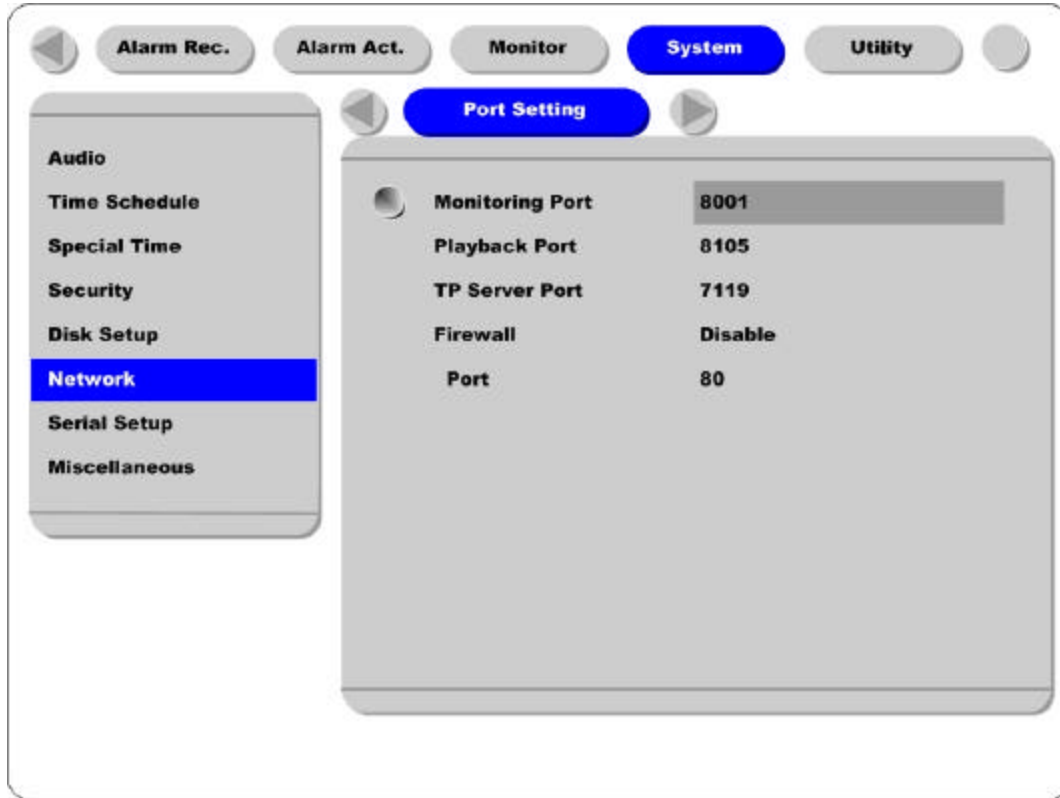
Group ID is for discriminating and managing the information received by the HRS from the ELX16-240 belonging to group. The group ID should be unique to avoid unauthorized access to the ELX16-240. Unauthorized users will not be able to access the ELX16-240 unless they have a login name and password, but they will be able to see the unit on their registration list.



Status

Displays the registration status of the ELX16-240.

5.7.6.4. Port Setting

**Monitoring Port / Playback Port**

ELX16-240 uses port 8001 for Monitoring and port 8105 for Playback. To change the port number to an open port (some firewalls and/or ISPs block certain ports), press the [ENTER] button and use the dialogue box.

TP Server Port

The port used for Transparent Protocol server.

Firewall / Port

If there is a firewall on the network and a unique port is available, user may configure the Monitor and Playback ports as one port. In order to change a port, select "Port" menu, and configure a suitable port value.

5.7.6.5. NTP Setting

NTP (Network Time Protocol) makes time of Network devices synchronize. They are composed of a central server for supplying standard time via Network and a client for receiving the synchronized time with connecting the server.



NTP Mode

Set ELX16-240's NTP mode between Client and Server.

NTP Server Loc.

It is possible to set after setting NTP Mode as "Client". Set whether NTP server is on Local Network or Internet (Public).

NTP Local Server IP

It is possible to set after setting NTP Server Loc. as "Local". Set the server's IP address. Set NTP server's IP address on local Network or the IP address of ELX16-240 that is set as server in NTP mode.

Interval (min)

Set a synchronizing interval.

<Note>

When NTP mode is set as “Client”, “Sync with NTP” of “**Time Setting**” should be as “On”.

5.7.7. Serial Setup

ELX16-240 has total 4 COM ports.



Device

Designate the connected external device.

Interface

Used to designate the protocol on the RS422/RS485 Menu.

COM1 and COM3 are fixed as RS232.

Baud rate/Parity/Stop (bit)/Data (bit)

Each value should be set according to the specifications of the connected external device.

5.7.8. Miscellaneous



<Button control>

- Press [MENU] button and select “Miscellaneous” below the “System” tab.

Remote Control ID

Up to sixteen ELX16-240s can be controlled with a single IR Remote Control. Designate each unit with a unique number under the ‘Remote Control ID’ menu. When not using remote controller, set it as “Off”.

<How to set remote controller >

- Aim remote controller at the ELX16-240.
- Press the “ID” button of remote controller until ELX16-240 reacts.
- If remote controller’s ID agrees with ELX16-240’s, all the LEDs on the front panel of the ELX16-240 will light up and a buzzer will sound.
- OSD menus can now be set with the remote controller.
- For more information, please refer to “[ELX16-240 Installation Guide](#)”.

Keyboard Control Addr

To set keyboard's control address in order to operate all ELX16-240's menus with keyboard. Default value is "32". If several ELX16-240s are connected with one keyboard, it can be collided. Then the default value should be changed.

Keyboard PTZ Addr

To set keyboard's PTZ address in order to operate each PTZ camera with keyboard. If setting just first camera's address of each ELX16-240, another cameras' are designated automatically. For example, 1st ELX16-240 has five cameras and 2nd ELX16-240 has six cameras, keyboard PTA address of 1st ELX16-240 should be set as "1" and one of 2nd ELX16-240 be set as "6". Be cautious that PTZ addressed are assigned to all cameras automatically in spite of non PTZ camera.

DVR ID

For use with the DVR Manager to control and manage several ELX16-240s.

Language

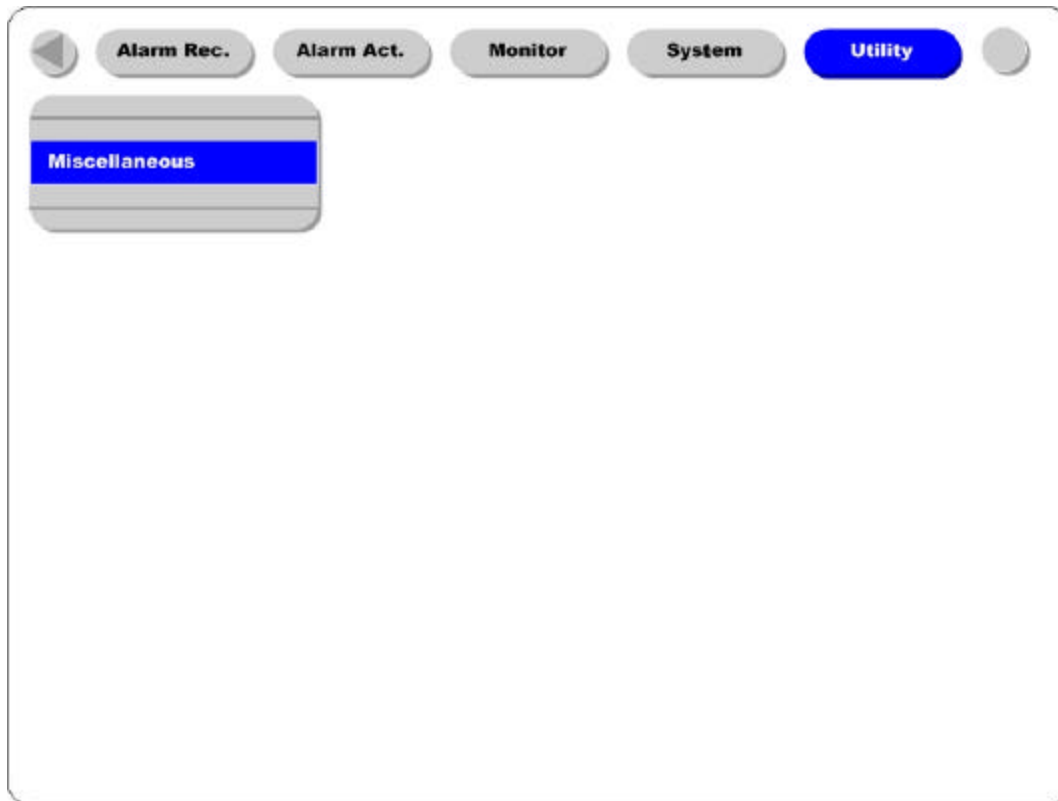
To select the language used for the OSD Menu.

Reset Values

To reset current configured values. To reset DVR, press the "Reset Values" button.

5.8. Utility

The following description is how to add/format internal or external HDD. ELX16-240 supports various external storages.



<Button control>

Press [MENU] button and move to "Utility" below the "System" tab.

5.8.1. Disk Manager

A connected HDD is detected automatically.



Select Disk

To select a Disk.

Action

Select from “Add/Remove/Format/Confirm Removed/Add used”.

- [Add]** : Add HDD for recording. Need to format.
- [Remove]** : Remove current HDD. HDD can be reused without data loss by the ‘Add Used’ command
- [Format]** : Format as ELX16-240’s file system. Not available to PC file system. “Alarm Partition” means to divide one HDD into two partitions; ‘Normal Recording’ and ‘Alarm Recording’ part.
- [Confirm Removed]** : Used when a removed HDD is still listed. ALL DATA WILL BE LOST!
- [Add used]** : Add a HDD that has been used and formatted. There is no need to reformat. It is possible only when HDD is added as Primary Disk.

Type

There are several symbols to indicate HDD status.

[R] : Available for recording

[V] : Connected and formatted as ELX16-240's file system.

If using 'Add used' command, it will be changed to [R]. There is no need to format again.

[F] : Connected but not available file system. After using 'Add', need to format to make HDD available for recording [R].

[*] : Connected and undergone the 'Add' command. HDD needs to be formatted to be available for recording [R].

[X] : HDD cable is not connected or HDD has a problem. It is recommended to delete from list using 'Confirm Removed'.

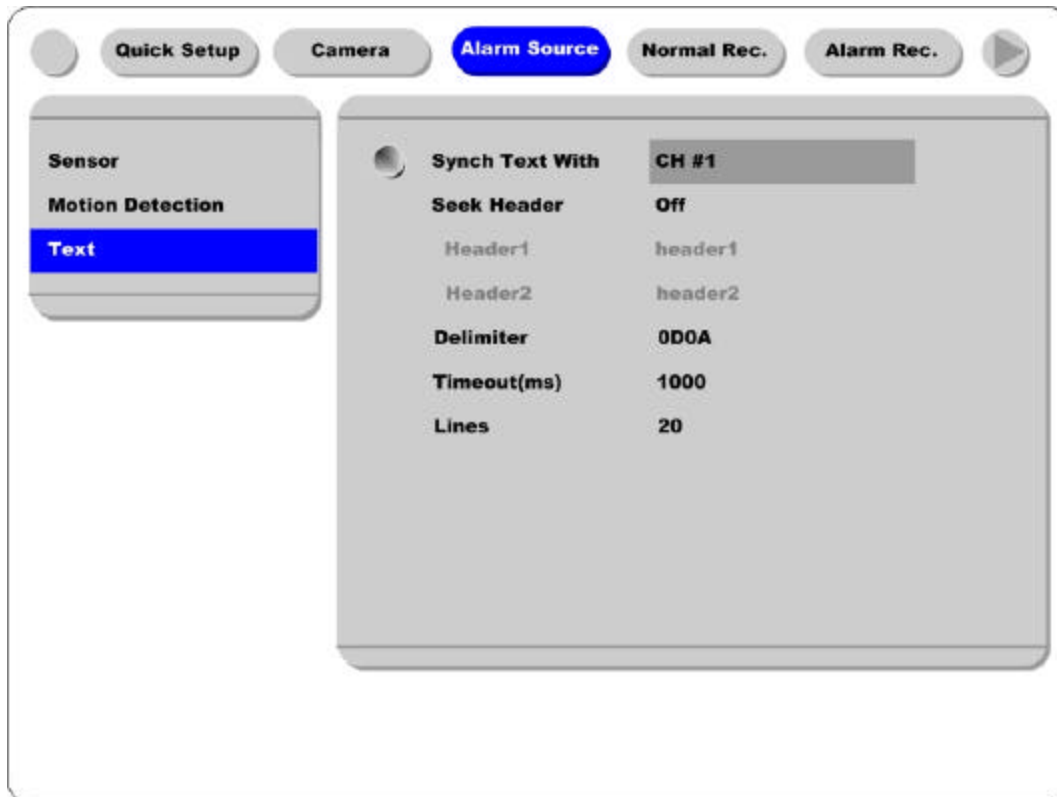
Advanced Configuration

6. Connecting External Device

6.1. Using Text Device

In order to use text device, the following four menus should be set; Text menu, Serial Setup's RS232 menu, Alarm Rec. menu, Normal Rec. menu

6.1.1. Setting at Text menu



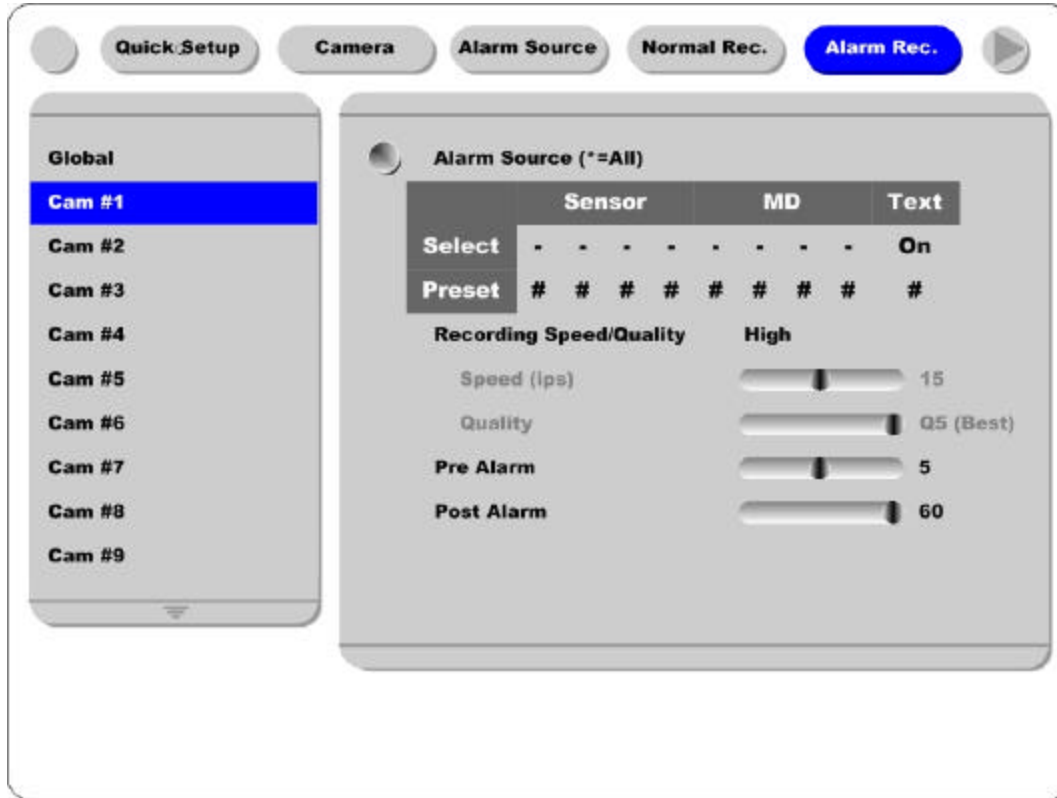
- Set both Recording and Monitoring as "On"
- Set "Sync. Text with" value.
- If the connected device is Star Finger 007, select it at "Device" menu. If not, set "Manual" and each sub-menu.

6.1.2. Setting at Serial Setup's RS232 menu



- Set RS232's device menu as "Text". And set baud rate, parity, stop, and data.

6.1.3. Setting at Alarm Rec. menu



- Set text event as “On”.

6.1.4. Setting at Normal Rec. menu



- Set event recording as “On” at each time schedule.

<Note>

Whenever pressing the “Help” button, information of displayed image is different.

The default value of Monitoring mode is to show just channel number. Then next step is to show channel name and text, event status, and HDD status.

The default value of Playback mode is to show all information. The next level is to show channel name and text, event status, and channel number.

So in order to view text data, press the “Help” button once at both Monitoring and Playback modes.

6.2. Using Keyboard

In order to use keyboard, the following two menus should be set; Serial Setup's RS232 menu, Serial Setup's PTZ menu

6.2.1. Setting at Serial Setup's COM1 menu



- Set RS232(COM1)'s device menu as "Keyboard". And set baud rate, parity, stop, and data.

6.2.2. Setting at Serial Setup's PTZ menu

- Set PTZ camera to control with keyboard. For more detailed technical solution, please contact the closest local distributor.



APPENDIX

#1. Technical Specification

<i>Hardware</i>	32bit RISC Embedded processor (266/200MIPS) Flash memory: 8Mbyte RAM: 64Mbyte OS: Embedded Linux
<i>Storage Device</i>	Int.: 2 HDD bays Ext: 2 IEEE 1394 (FireWire) connection ports Supports Disk Management Tool for all disks (Reboot is required when HDD changed) Total manageable capacity: 4 TB
<i>Image Quality Control</i>	5 Levels (Q1-Q5)
<i>Image Compression</i>	Compression Algorithm: Differential Wavelet Compression Rate: 20:1 ~500:1 Average file size: 3 ~ 5KB (Standard Quality)
<i>Video Channel</i>	NTSC or PAL video format are supported 16Ch. analog video inputs via BNC connector
<i>Recording Performance Analog Ch</i>	Max. 240ps(NTSC) Max 30 fps (NTSC) per channel if 8ch used Max. 30fps (NTSC) per channel if 8ch used Max. 15fps (NTSC) per channel if 16ch used
<i>Schedule Recording</i>	Daily: Day / night / Four-segment time frame Weekly: Weekdays / Weekends Status: Normal / Event
<i>Matrix Digital Output Schedule</i>	Daily: Day / night / Four-segment time frame Weekly: Weekdays / Weekends Conditions: MD, sensor input
<i>Configurable Recording Conditions</i>	Recording speed: None to 30 fps Image quality: 5 Levels Event conditions: MD & sensor inputs
<i>Pre / Post Alarm Recording</i>	Pre Alarm Recording: 1 ~ 10 seconds Post Alarm Recording: 1 ~ 60 seconds
<i>Intelligent file system</i>	Data-loss protection against power failure

<i>Event Triggered Video Data Preservation</i>	Overwrite prevention of Event triggered data
<i>Event Log Recording</i>	Log archiving on HDD Log search & monitoring via Network
<i>Data (Video & Audio Clip) Back-up</i>	External HDD: IEEE1394 (FireWire) or USB PnP Memory Stick: USB port
<i>Data Copy (Max. 1 minute's video clip)</i>	VHS Video Tape: Video output port for VCR Backup Notification: Daily / Weekly / Monthly PnP USB storage (Compact Flash, Smart Media, Memory Stick, SD Card)
<i>Displaying Performance</i>	Frame Rate on CCTV Monitor: Max. 120fps Frame Rate on PC: Max. 60ips Display Channel: Quad, Auto Sequential Misc. Play speed: 1x, 2x, 4x, 8x, 16x (FDW & REV) Supports Step-Forward, Step-Reverse. Instant data access based on time and event log
<i>Digital Zoom</i>	2 times digital zoom (Live & Playback Mode)
<i>Event Triggered Pop-up Video</i>	Triggered by motion detection or sensor input
<i>PTZ Control</i>	Ports: RS232(2), RS485/RS422(2)
<i>Local User</i>	Front panel push button & IR Remote (controls IP video channels as well)
<i>Remote User</i>	On-the-screen PTZ control on PC Preset: 8 points per channel Group: 1 group per channel Return Home Position' support
<i>Sensor Inputs and Relay Outputs</i>	Software-controlled 16 sensor inputs Software-controlled 4 relay outputs

<i>Audio Recording and Playback</i>	Input: 1Ch, line-in, 1Vpp Output: 1Ch, line-out, 1Vpp Level: -7 ~ 8 Recording level control Support 20dB Amp. for low level audio recording Supports local and remote audio monitoring
<i>Network</i>	Protocol: TCP/IP, ARP, ICMP, DHCP, PPPoE Line: 10/100Mbps Ethernet (RJ-45)
<i>Simultaneous User Support over Network</i>	Monitoring: Max. 10 users Playback: Max. 10 users
<i>Management and Firmware Upgrades</i>	Firmware upgrades via Network
<i>Security</i>	Password (User or Administrator Authentication) Watermarking (For image copying)
<i>Power</i>	Free Voltage
<i>Power Consumption (with 2HDD)</i>	Max. 85W Typical 50W
<i>Environmental Spec</i>	Operating: 41 ~ 113 degrees F. Storage: -49 ~ 149 degrees F.

#2. Utilizing IP Addresses on Local Network

#2.1 Introduction

Most of our businesses are done via Internet, lately. We play with information by transmitting through e-mails and searching the world of Internet. IP address is what we utilize to access to the Internet.

Currently used IP addresses are limited. And there are 5 classes' networks in the world for now, and a network contains lots of IP addresses. A network can hold limited IP addresses. The numbers depend on network class. 5 classes are from A to E, and the most common one is C class network.

#2.2 IP construction and Network class

1) IP construction

xxx	xxx	xxx	xxx	(xxx: 0 – 255)
X1	X2	X3	X4	

2) Network class

A class: A network that contains IP addresses from 0 to 127 at room 'X1'.

- Network ID: X1
- Host ID: X2, X3, X4
- Total number of A-class networks is 128 in the world.

B class: A network that contains IP addresses from 128 to 191 at room 'X1'.

- Network ID: X1, X2
- Host ID: X3, X4
- Total number of B-class networks is 65,534 in the world.

C class: A network that contains IP addresses from 192 to 223 at room 'X1'.

- Network ID: X1, X2, X3
- Host ID: X4
- It is the most common network in the world, and the total number of C-class networks is 2,097,152

D class: A network that contains IP addresses from 224 to 239 at room 'X1'. D-class network is for multicasting, and it is not allowed to use for common users.

E class: A network that contains IP addresses from 240 to 255 at room 'X1'. E-class network is reserved.

#2.3 C-class Network

1) Features of Addresses

IP address: Three digits number in room 'X4' are for Host ID, and the numbers are from 0 to 255. Among the numbers, 0 is used for Network ID, 1 is used for Router IP (Gateway address) and 255 is used for Broadcast address. Therefore the numbers from 2 to 244 are IP addresses that can be assigned to products.

Network ID: It is to identify a network. Generally the first number is assigned as Network ID.

Gateway address: It is an IP address of router that is connecting Internet and local network. Remote users can access local network over Internet through the gateway (router). Generally the second number is assigned as Gateway address.

Broadcast address: It is to broadcast to all devices that are connected on local network. Broadcast address is a destination for broadcasting and it is determined by calculating. All devices connected on local network have a same Broadcast address.

Subnet Mask: It is to divide a local network into two remote networks. Subnet mask shows the IP quantity in a certain network. The numbers that can be used as subnet mask are limited (0, 4, 8, 16, 32, 64, 128)

2) Network configuration

(1) To use as one network

Network ID: xxx.xxx.xxx.0

Gateway Address: xxx.xxx.xxx.1

Subnet Mask: 255.255.255.0

Broadcast Address: xxx.xxx.xxx.255

IP Addresses: xxx.xxx.xxx.2 – xxx.xxx.xxx.254

(2) To use as two sub-networks (1/2 + 1/2)

Sub-Network ID: xxx.xxx.xxx.0

Gateway Address: xxx.xxx.xxx.1

Subnet Mask: 255.255.255.128

Broadcast Address: xxx.xxx.xxx.127

IP Addresses: xxx.xxx.xxx.2 – xxx.xxx.xxx.126

Sub-Network ID: xxx.xxx.xxx.128

Gateway Address: xxx.xxx.xxx.129

Subnet Mask: 255.255.255.128

Broadcast Address: xxx.xxx.xxx.255

IP Addresses: xxx.xxx.xxx.130 – xxx.xxx.xxx.254

(3) To use as three sub-networks (1/4 + 1/4 + 1/2)

Sub-Network ID: xxx.xxx.xxx.0

Gateway Address: xxx.xxx.xxx.1

Subnet Mask: 255.255.255.192

Broadcast Address: xxx.xxx.xxx.63

IP Addresses: xxx.xxx.xxx.2 – xxx.xxx.xxx.62

Sub-Network ID: xxx.xxx.xxx.64

Gateway Address: xxx.xxx.xxx.65

Subnet Mask: 255.255.255.192

Broadcast Address: xxx.xxx.xxx.127

IP Addresses: xxx.xxx.xxx.66 – xxx.xxx.xxx.126

Sub-Network ID: xxx.xxx.xxx.128

Gateway Address: xxx.xxx.xxx.129

Subnet Mask: 255.255.255.128

Broadcast Address: xxx.xxx.xxx.255

IP Addresses: xxx.xxx.xxx.130 – xxx.xxx.xxx.254

(4) To use as four sub-networks (1/4 + 1/4 + 1/4 + 1/4)

Sub-Network ID: xxx.xxx.xxx.0

Gateway Address: xxx.xxx.xxx.1

Subnet Mask: 255.255.255.192

Broadcast Address: xxx.xxx.xxx.63

IP Addresses: xxx.xxx.xxx.2 – xxx.xxx.xxx.62

Sub-Network ID: xxx.xxx.xxx.64

Gateway Address: xxx.xxx.xxx.65

Subnet Mask: 255.255.255.192

Broadcast Address: xxx.xxx.xxx.127

IP Addresses: xxx.xxx.xxx.66 – xxx.xxx.xxx.126

Sub-Network ID: xxx.xxx.xxx.128

Gateway Address: xxx.xxx.xxx.129

Subnet Mask: 255.255.255.192

Broadcast Address: xxx.xxx.xxx.191

IP Addresses: xxx.xxx.xxx.130 – xxx.xxx.xxx.190

Sub-Network ID: xxx.xxx.xxx.192

Gateway Address: xxx.xxx.xxx.193

Subnet Mask: 255.255.255.192

Broadcast Address: xxx.xxx.xxx.255

IP Addresses: xxx.xxx.xxx.194 – xxx.xxx.xxx.254



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